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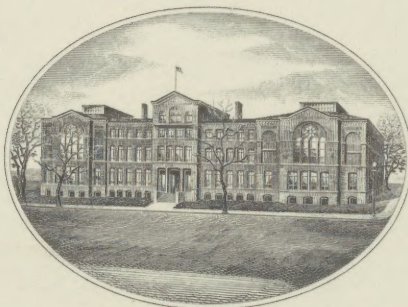


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ARCTIC SURVIVAL AND RESCUE REPORTS

NORTH ATLANTIC AREA



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R E S T R I C T E D

AIR UNIVERSITY DOCUMENTARY RESEARCH STUDY

ARCTIC SURVIVAL AND RESCUE REPORTS

NORTH ATLANTIC AREA

Compiled by
ORON P. SOUTH, M.S.

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DOCUMENTARY RESEARCH DIVISION
U.S. AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

July 1949

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PART ONE

SURVIVAL AND RESCUE REPORTS

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1. "Diary (By One Now Dead)." Manuscript copy loaned to Arctic Desert Tropic Information Center by Colonel Jesse Auton, Atlantic Division, Military Air Transport Service. | |
| Diary kept by pilot of B-26 which crashed in Labrador 10 December 1942. Although only a few miles from an Eskimo village no attempt was made by the crew to walk out since they were not sure of their location. On 23 December three members started south in the boat that belonged to the B-26. No remains have ever been found of this group. The remainder of the crew was found in March after they had starved to death. The last diary entry is 3 February 1943. | 1 |
| 2. Tucciarone, Alexander L., Pfc AC. "Report of Private Tucciarone Relative to Experiences of Personnel Forced Down in the Arctic." ADT-655. | |
| Account by one member of a B-17 crew which crashed on ice cap while searching for a C-53. See also 3 below. | 18 |
| 3. "Transcript of Interview with Captain Armand L. Monteverde, Ferrying Division, A.T.C." April 26, 1943. ADT 656-C. | |
| One of the most famous cases in Greenland rescue history. Captain Monteverde piloted the B-17 which crashed on the ice pack 9 November 1942. The crew remained on the ice cap until the following April when they were rescued by Colonel Bernt Balchen who landed a PBY on the snow and made a successful take-off. | 21 |

4. "Lake O'Connor Incident." From "Search and Rescue." Manuscript donated to ADTIC by Captain Donald A. Shaw, ATLD, MATS. 3444. M-34420-NC.

The story of a C-87 which landed in Quebec 4 February 1943 with 20 men aboard, including seven civilians being returned from BW-8 because of illness. Rations and survival equipment being scarce, the men had a difficult time until they were accidentally located and supplies were dropped. Part of the story is concerned with attempts to fly the C-87 from the lake where it landed.

43

5. "Delicious Meal Awaits." Time, 3 May 1943, pp 66-68.

Survival story of a Catalina which landed on Greenland ice cap while flying through ice fog. After 16 days the crew was rescued by dog team.

49

6. Wall, C. B. "Fourteen Days of Hell on an Icecap." Readers Digest, June 1943. pp 47-52.

Three men who apparently had had little instruction in Arctic survival have a rough time on the Greenland ice cap. An example of how close men can come to cracking up without actually realizing their condition.

51

7. "Account of Cpl Paul A. Curry." From Hqs North Atlantic Division, Air Transport Command, "Historical Data," Appendix, 1 July-30 Sept 1944.

Cpl Curry was radio operator of a B-17 which ran into trouble over Quebec in the vicinity of Mingan. After Curry and four others jumped the pilot managed to get the plane under control. Of the five which jumped Curry and two others got together and managed to exist until rescued three weeks later. The other two men were drowned soon after landing and the bodies recovered from the lake near where Curry landed.

58

8. Coffman, Robert E., Capt RAF. "The Miracle of Umanarsuk." The Saturday Evening Post, 24 June 1944. p 20+.

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| | The story of three men marooned on a bleak island near Greenland by the failure of an aged Hampden bomber. With few rations these men survived on courage until rescued. | 78 |
| 9. | "Men, Dogs, and Machines Save Flyers Who Crash in the Arctic." <u>Popular Science</u> , October 1945, p 122+. | |
| | Resume of the work done by North Atlantic Division Search and Rescue Squadron. | 88 |
| 10. | "Kee Bird Rescue." Manuscript copy donated to ADTIC by Capt Donald A. Shaw, ATLD, MATS. | |
| | An account of the planning back of Lt. Cavnar's flight to pick up the members of the Kee Bird crew. | 94 |
| 11. | "Operation Canon." From <u>Canadian Army Journal</u> , May 1948, pp 9-15+. | |
| | RCAF and Army cooperation to rescue an injured missionary from Moffet Inlet on the northern tip of Baffin Island. Contains considerable discussion of the detailed planning that went into preparation for the mission. | 98 |
| 12. | Letter Charles M. McCorkle, Colonel, USAF, Hq Newfoundland Base Command to CG Newfoundland Base Command, 16 April 1949, subject, "Report on Search, Rescue, and Recovery of C-82 Crash." | |
| | Resume of a new and significant method of locating downed aircraft. By plotting weather conditions at the scene of the forced landing, the C-82 was located with reasonable accuracy. . | 114 |
| 13. | Letter Donald A. Shaw, Captain, USAF, Atlantic Division, Military Air Transport Service, to Commanding General, Atlantic Division, MATS, 12 January 1949, subject, "Trip Report." | |
| | A summary of the events leading up to the rescue of personnel stranded on the ice cap in December 1948. This is an excellent account of the details of the attempted glider rescues, the reasons why the helicopter was not considered except as a | |

last resort, the planning behind the final rescue,
and the ease with which the rescue could have been
made had a few details been slightly different. . 118

PART TWO

SURVIVAL INSTRUCTIONS

1. Headquarters North Atlantic Wing, Air Transport
Command. GUIDE TO ARCTIC SURVIVAL. 12 May 1943. . 131
2. "Keeping Your Mind in Shape." Manuscript sent to
Arctic, Desert, Tropic Information Center by Colo-
nel Joseph I. Greene, editor Infantry Journal. In
ADTIC administrative files 700.6 Projects, Misc.
Survival. 143

PART THREE

SURVIVAL EQUIPMENT

1. "Medical Plan for Assisting Crash Victims." From
"Medical Historical Record," Army Air Forces, North
Atlantic Division, Air Transport Command, October
1944-December 1944, pp 21-25. M-31263-S, Vol 3.

Plan developed by NAD surgeon to assist survi-
vors of airplanes carrying a large number of
passengers. 151
- DISTRIBUTION. 156

PREFACE

This volume was designed as a companion to a similar collection for the Alaskan area. The two will provide an insight into the difficulties imposed by unfamiliar terrain and climate, inadequate equipment and techniques. An attempt has been made to note all the better known survival stories, either by inclusion or by reference. It is believed that the reports included are representative of true conditions in many parts of the region of the North Atlantic Division.

The spelling and word usage has been left as it appeared in original manuscripts or in the manuscripts available at the Air University. In cases where obvious typographical errors have been made, these have been corrected only in cases where the same word was spelled twice and differently. Editorial comment is indicated by the notation "Ed."

The list of suggestions for further reading generally parallels that in the Alaskan volume. In order to avoid duplication only the more pertinent references are repeated.

A glance at the table of contents will indicate that many stories of a sensational nature have been included. This was done for two reasons: first, to stress the problems which occur or may occur, and; second, because those incidents where rescue was delayed or never occurred received more publicity than routine operations. The recent Greenland rescue

of December 1948 is a case in point. In all probability that story would never have made headlines had this been a routine operation, as it might well have been had search and rescue experts had the equipment available which they knew was necessary. The details would have been buried in the files and the entire incident would have received only a few lines in a historical report.

Through a study of these non-routine reports it is hoped that the students and instructors of the Air University interested in such matters may gain an appreciation of the many problems involved; as well as of the responsibilities of many individuals from the pilot to the officers in Washington charged with providing personnel and equipment for search and rescue.

SUGGESTIONS FOR FURTHER READING*

Airlines War Training Institute. "Survival In The Arctic."
Washington, March 1943. ADT 6217.

"Air-Sea Rescue." Document donated to Air University Libraries by Captain Donald A. Shaw, Special Assistant to the Commanding General, Atlantic Division, Military Air Transport Service. M-34419.

Summary of activities of Atlantic Division search and rescue work from beginning of war until 1949.

Arctic, Desert, Tropic Information Center, "Classified List of Reference On Arctic Conditions," August 1943. M-20277-C.
CONFIDENTIAL

Contains references on Survival and Rescue.

_____, "Medical Conditions in Arctic Regions," Informational Bulletin Medical Series No. 1. M-27765-NC.

Discusses acclimatization to Arctic conditions, psychological factors which might keep a downed flier from sleeping properly from fear of freezing, clothing and proper fitting; effects of cold and methods of treatment of frozen and frostbitten members; snow blindness, and how to prevent it; sunburn; insects; sanitation and sewage disposal. All discussed from common sense point of view - nontechnical.

_____, "Nine School Lectures, The Arctic," (Three Lectures): Lecture III--Survival. M-7284-NC.

Deals primarily with survival in land areas, uses Greenland crack-up as an example of what can happen to an ignorant unprepared crew. Fairly general, and needs to be supplemented by more specific reading on how to make rabbit traps, lean-to, etc.

_____, "Survival: A Selected Bibliography," 1 Jan 1945.

Air Technical Service Command, "Alaskan Field Test of AAF Emergency and Survival Equipment," May 1945. M-25266-NC.

Balchen, Colonel Bernt, Major Corey Ford, and Major Oliver La Farge. War Below Zero, Foreword by General H. H. Arnold. Houghton Mifflin Co: Boston 1944. 940.542, B18w.

Discussion of conditions on Greenland during the war, with main story devoted to account of B-17 crash on ice cap and attempts to rescue survivors. Interesting and instructive.

*Accession Numbers in Air University Library are indicated by the prefix ADT or M.

Custer, Ben Scott, Captain USN. "Down In The Arctic." Colliers, 29 Jan 1949. p 28+

Five men in a Beechcraft forced down approximately 550 miles south of Churchill in swampy country. Relates their experiences with survival equipment and trying to live off the country.

Department of Mines and Resources, Mines and Geology Branch, "Emergency Food In Arctic Canada," Ottawa, 1945. ADT 5996.

"Discussion of Arctic Conditions by Dr. Vilhjalmur Stefansson (Special Consultant, Office Coordinator of Information) at a Conference Held at Headquarters Army Air Forces, Directorate of Weather, April 4, 1942." Washington, April 1942, Weather Research Center, Vol. IV, No. 1, p 21. M-20003-R.

Discusses possibility of living on ice floe for extended period of time without receiving supplies from outside.

Hanson, Earl Parker, Expert Consultant O.Q.M.G., "Reconnaissance Report on Concentrated Rations of Primitive Peoples," 10 November 1942. In ADT Administrative Files.

Considerable discussion of pemmican as emergency and staple food.

Headquarters Air Rescue Service, "Reports on Air Rescue Service Plans and Equipment." Ltr to Commanding General Air University, 24 March 1949. M-33978-R.

Gives location of present rescue units, brief history of Air-Sea Rescue, and summarizes techniques and equipment used and desired.

Headquarters Alaskan Air Command, Operations Analysis Section, "Analysis of Events Preceding And Following The Crash Landing Of A B-29 On Seward Peninsula, Alaska, 23 December 1947," Report No. 2, March 1948. M-32539-R, No. 2.

_____, "Aircraft Emergency Survival Kits and Equipment." Ltr to Chief of Staff, USAF. (1948)

Meeting of experienced Arctic personnel to determine the components need for various types of survival kits.

Headquarters Strategic Air Command, Operations Analysis Section, "Outline of Polar Survival Procedures To Be Followed By VHB Crews After Crash Landing," Report No. 20, 22 Oct 1947. M-29779-NC, No. 20.

_____, "Polar Survival and Rescue," Report No. 6, 17 February 1947. M-29779-S, No. 6. SECRET.

_____, "Three B-29 Airplane Accidents In The Arctic," Report No. 18, 15 September 1947. M-29779-S, No. 18. SECRET.

Kelsey, Mavis P., Flight Surgeon, XI Fighter Command, "Rescue of Personnel Forced Down in Aleutian Waters." ADT 767-C. CONFIDENTIAL.

Case histories of pilots forced down in the Aleutians.

"Search And Rescue." Manuscript donated to AUL by Captain Donald A. Shaw, ATLD, MATS. M-34420-NC.

Summarizes rescue and survival work over North Atlantic route during war. More detailed for war years than "Air-Sea Rescue."

South, Oron P., Compiler. "Arctic Survival And Rescue Reports, Alaskan Area." Documentary Research Study, Air University Libraries, Maxwell Air Force Base, Alabama. March 1949.

Contains stories and reports for the Alaskan Area similar to those in Greenland volume. +

Stefansson, Vilhjalmur, "Life on the Polar Sea," Project S-1, Section 10. The Stefansson Library, New York, New York. ADT 2326.

_____, "Living Off the Country," Geographical Review, 7:291-310, May 1919.

Stefansson advocates living off the country as a means of Arctic exploration. The same method, however, could be used equally well by stranded personnel in need of food.

USAF, Air Material Command, "Survival Ration, Alaskan Field Trial," 1948. M-27897-7-NC.

_____, "Test Survey of Space Available For a Survival Kit In Fighter Aircraft." MCREXD-670-21G. 16 August 1948. M-27897-7-NC, MCREXD-670-21G.

USAF, Directorate of Plans and Operations, Operations Division, Memorandum To Whom It May Concern. Subject: Interrogation of Survivors from Greenland. [1949] M-34367-NC.

Interrogation of survivors of C-47 that crashed in Greenland during the early part of December 1948. Contains information on survival techniques and equipment, and rescue efforts.

PART ONE - SURVIVAL AND RESCUE REPORTS

DIARY (By One Now Dead)

October 15, 1942

Flew from Presque Isle, Maine to Goose Bay, Labrador, over some of the wildest country I have ever seen - the Canadian Wilds. Extremely rugged mountains with thousands of lakes, each a different shape, and each having a different surface level. Arrived at Goose right after the bi-monthly boat, so we had an especially good meal. Saw our first snow on the nearby mountains, although it is fairly warm on the post.

October 16, 1942

Still weathered in - had our first snow today, although it was light, and didn't last very long. Saw the Northern Lights tonight. Looked like a bent search light across the sky.

October 17, 1942 (Sunday)

Went up for a ride this afternoon - took a FBV pilot along to show him what it's like to ride in a real airplane. We looked the base over and then flew up Grand Lake, which is about 40 miles long. There was ice in the rivers that flowed into it, and snow on some of the hills. We buzzed the whole way back, and it was very pretty, though extremely rugged. Our navigator friend was properly impressed with the performance of our "Iron Cigar".

October 18, 1942

Everybody left but the B-26's. It's pretty lonesome here, but it's kinda nice to have this whole place to ourselves.

October 21, 1942

Came to BW-1, Greenland, this afternoon. Our first sight of land was several jagged, snow-covered peaks showing above the clouds. As we came closer, the clouds disappeared, and we could see the entire coastline - it was really beautiful. Icebergs were floating in dark-blue water beyond which mountains, which seemed to be made of rusty iron, rose almost perpendicular. Beyond these was the Ice Cap, a smooth-topped layer of pure, white, snow several thousand feet thick. In several places the Ice Cap had worked down through valleys to the sea, where it broke off and formed icebergs. We could have looked for an hour without getting tired but we had to work our way up the fiord and land, on a runway made of steel plates. After landing, we had quite a reunion with friends who left before

we did. Our B.O.Q. is swell - clean sheets, a good heater, and everything. Best of all is the amplifier on the wall - we get a 2 1/2 hour program of recorded music each evening. We could hardly ask for anything nicer.

October 23, 1942

Janssen, Miller, Sloan and I started out right after dinner to climb the mountain back of the camp. It was really tough going until we got above the timber line, and then it was still pretty steep. When we got to the top as seen from the valley we found that it was just the first ridge. After climbing two more, came back and really made time. I came back in 35 minutes, the same distance I had climbed in 2 hours. For 5 hours we were soaked with sweat, even when we were walking in snow, but we really had a swell time.

October 25, 1942

Went to church this morning. Radio has been working over-time this afternoon. Bob Hope, Fibber McGee and Molly, Truth or Consequences, Bing Crosby, Music Hall.

October 26, 1942

We've begun eating two meals a day in the barracks. Fruit cocktail, apple juice and coffee for breakfast; chile con-carne, pork and beans, graham crackers, cheese, coffee, and assorted chocolates for dessert.

October 27, 1942

Went up to the Ice Cap today - more ice than I ever saw before in my life. It was really rough walking, but we had a couple of inches of snow last night, and everything was really pretty. All the streams and lakes were frozen over, so we did plenty of sliding. I'd like to go ice skating tomorrow. We've had some peculiar weather lately here. There was about 2 inches of snow on the ground the night before last. It snowed all yesterday A.M. and rained all afternoon, so we really had one sloppy mess.

November 12, 1942

We're still sitting here, with 14 minutes less daylight each day. They're less than 6 hours between sun-rise and sun-set now. Had about 2 inches of snow last night, and spent most of the morning sweeping it off the planes. They say that there is a chance of leaving tomorrow, but this place seems so much like home that it doesn't seem like we should leave.

November 16, 1942

This place is really full of changes. Yesterday afternoon, Janssen and I walked down to the river. There was a solid sheet of ice resting on the rocks and it was covered with almost 2 inches of snow. Every once in a while we would break through up to our knees, but there was nothing under the ice. Last night, we had rain with a warm wind, with gusts up to better than 60 mph, so this morning there were only isolated patches of ice left. Today was the first time in 2 weeks that we have been able to walk on the bare ground. We've had all kinds of extremes: a day or two when ceiling and visibility were perfect, and days when ceiling and visibility were absolutely zero. Most of the days have been fairly warm (30-45 degrees F) but one day it was 6 degrees. We've seen days when not a breath of air stirred, and days when the wind blew 30 mph and more, for 12 hours at a time.

November 20, 1942

They got us up this morning, but by 5:30 it was raining, so we went back to bed. It was one of the worst mornings we've had yet. The wind started up about daylight and kept up about all day long. There is a good bit of talk to the effect that we will be here for the winter, and it isn't a possibility by any means.

STRAY BITS OF HUMOR

When we were approaching this place, we had to fly up a fiord which was close to several others. Just as we started in, somebody started singing the V.E.F. "You take the right fiord and I'll take the left fiord, and I'll be in Greenland afiord you." Miller burned his hand on the stove and had to have it bandaged, but didn't want to admit how he got it, so when somebody asked how he got his hand hurt, he said, "I was posting a timber wolf, and got a splinter in my hand."

November 26, 1942 (Thanksgiving)

I still claim that this is screwy weather. We were alerted this morning at 3:00. The moon was shining brightly through broken clouds. By 3:30 there was a solid overcast. We killed time until 6:00 when we got briefed. It was still overcast and seemed to be getting worse. The A-10's and B-25's finally started kicking off, but about that time it started raining. At 8:00 Captain J. Jones called everything off. It was raining, and it looked like the ceiling was very low. About 10 minutes later, it stopped and an A-20 came over at about 600 room to spare.

4

By 8:30 the sun was shining and everything looked as nice as we could have asked for, but by that time it was too late to take off. So everybody came back and sacked it up. (Sunrise 8:31, sunset 3:05). Walked in the Mess Hall at noon and hardly recognized the place - tablecloths on the tables, mimeographed menus and everything. Roast tom turkey, dressing, green peas, yams, carrot salad, pickles, olives, candy, peanuts, apples, oranges, pie and a package of cigarettes. Went to the Thanksgiving program at the Recreation Hall tonight. After the program, several of us went down to the Music Room and played a few marches. My lip got shot pretty quick, but it was lots of fun.

December 2, 1942

The wind has blown constantly for over 4 days and nights and never less than about 15 mph., but usually about 25-30. Last night, the average for a half hour was 73 mph. Highest gusts recorded were 112 mph. Today was calm, however, and it snowed practically every day. Mail hasn't gone since November 5th. The Northern Lights were brighter and more active than we've ever seen.

December 4, 1942

They said that we had a good chance of getting out today, but last night at 10:00 it was clear and calm. By midnight, there was a high overcast, and by 1:00 the wind had started blowing. The wind has been blowing ever since, and has been harder than ever before.

December 7, 1942

A year ago today. They got us up this morning at 7:30. We didn't believe there was anything to it at first, but we had weather briefing at 9:00. But the wind was too strong, so we are still here. However, the control officer said, "You'll be flying in 2 days at the most - either east or west". There aren't but 3 or 4 who want to go east. We taxied around to loosen the brakes, and came to the head of the run-way. As we were turning around, the Tower called "May fly to Mollie U - what are your intentions?" They weren't taking any chances.

December 8, 1942

We left this morning. According to the Weather Man we have perfect weather for the entire trip, so we took off, and I proceeded to learn how to fly all over again. We climbed up and looked out over the Cap, and it looked pretty good, so we started out,

We ended up by running into a bank of clouds about 50 miles in. We were about 13,000 feet when we turned back, and the clouds were still above us. Then we tried to fly down to Cape Farewell and cross over, but the clouds were so bad that we lost sight of Greenland about 50 miles south of Siniattak. We kept going though, in the hopes that we could find a break. Popovick and Hamilton broke formation and we lost them when we went over an overcast and they went under it. We went on about 75 miles south of the Cape and it was still bad, so we came back. It took us almost twice as long to get back without that radio compass. We came in and landed (I greased it in). About halfway up the runway, we saw about a dozen B-26's. I was really happy to see them because I would have hated to be the only one to turn back. When we landed, there were still 4 ships out - Hearn, Popovick and Denison, but we were the last ones to land here. We have heard that Fack and Popovick and Hamilton got to Reykjavik, but haven't heard from the other two. (Sunrise 8:56, sunset 2:47)

December 10, 1942

Took off at last for Goose Bay. About 1:15 out, we ran into some clouds, and I turned around and called for the formation to turn also. One ship came out. I think I saw the other two P-40's later, but I lost him while letting down below the clouds. We found an opening to the SW at about 2,000 feet, and after flying in that direction, we broke out. We finally had to go back up to 13,000, but it was clear sailing, so we kept on. Lieut. Josephson gave me a heading to get back on course, but we know now that it was too big a correction. About half-way, I picked up the Goose Bay beam, but the set went dead after a few minutes. It was too late to turn back then, so we kept trying to get it on the compass and liaison sets, but couldn't. We finally hit the coast, and decided we were south of Goose Bay, so we turned north. When we finally realized we were North, we were almost out of gas. As we turned around, I started looking for a place to land. I wanted to get back where there were trees, but the engine started missing, so we came on down. The crew never batted an eye when they were told they were going to make a crash landing. Even if I do say so myself, it was a good landing, and Lieut. Janssen did a good job of cutting the switch. We hit a rock that tore the bombay open, and one prop tip went through the fuselage right behind me, but outside of that, the ship was intact. It swung around almost 90 degrees without stopping, but the fuselage made a good windbreak that way. (Hit at 1855 GMT) It was almost dark, so after eating a cold ration, we went to bed in the ship. We had 17 blankets, a comforter and a bed roll, but we were still cold, and couldn't stretch out either. None of us slept very well. I spent the

night figuring out where we were. Lieut. Josephson took a star shot, and the next morning we compared notes and decided we were about 300 miles north of Goose Bay at about 58 degrees latitude.

December 11, 1942

Lieut. Josephson walked to the fiord on the west, and Golm to the one on the east. We spent most of the day cleaning up the ship and pooling all the food. In the afternoon, Lieut. Janssen and I climbed the mountain in front of us, but didn't learn much. Nolan worked on the put-put all day, without results. Late in the afternoon, we made a fire out of gas and oil in a tin can. That night, as on the 10th, we cranked the dinghy radio. It was pretty windy, so we spent the night in the ship, but still didn't do much sleeping.

December 12, 1942

Made three big improvements in our situation. Lieut. Janssen and Golm discovered a lake close to the ship, and saw a fox. Waywrench and I saw about 50 seals. In the fiord saw wolf or fox. We know that there is food here. We made a lean-to out of tarps under the wing in the toe of the ship, and we slept out there. It was much better, but still not very satisfying. Before going to bed, we cranked the radio again, and Lieut. Josephson took some more star shots.

December 13, 1942 (Sunday)

When the star shots were figured out, it showed us to be at 58 degrees, 12", close to the town of Hebron. Worked on the put-put all day, with no success, so we tried to work the liaison set on the batteries. They were too weak. Then we pooled our covers and all slept together in the lean-to.

Monday, December 14th

Wind blew all day with increasing velocity and snow. Our lake went dry, so we had to go back to melting snow. We went to bed early.

Tuesday, December 15th

Didn't get up till noon because the wind was blowing. Our breakfast consisted of 9 cups of coffee and a package of fig newtons. The weather was very discouraging all day, but late in the afternoon, Nolan pulled the put-put through a couple of times, and it caught. It didn't put out, but 5 volts however,

but we were still much encouraged. We ate a fairly big supper, and went to bed early.

Wednesday, December 16th

Had to eat a cold breakfast (chocolate bars and caramels) because the wind blew too much snow in our fire. Lieutenants Janssen and Josephson went fishing, without any luck. Nolan changed voltage regulators and got 26 volts, long enough for me to pick up a couple of stations on the Edison receiver. The put-put stopped suddenly, but we hope we know what is wrong with it, so we may be able to get a message out soon.

Thursday, December 17th

The put-put out, but we couldn't get the voltage up to the front. Must be a short somewhere. We tried to send on the Command on HC batteries, but they were too dead.

Friday, December 18th

Had high winds all night and plenty of snow blew in. We didn't get up until noon, and as soon as we could get the place cleaned up, we went back to bed. Too windy to do anything.

Saturday, December 19th

More snow last night. Nolan and Mangin tried to work on the put-put but it was too cold. We built a fire in the lean-to, and thawed out.

Sunday, December 20th

It was so windy, we stayed in bed all day.

Monday, December 21st

Everything was really snowed in, so we spent the day eating, thawing out blankets, and planning the trip south. Lieut. Josephson, Lieut. Janssen, and Sgt Nolan planned to head south in the boat the first clear day.

Tuesday, December 22nd

Had a perfect day, the first clear calm day in over a week. We worked on the boat and cleared snow away from the lean-to all day. We ate a pretty big meal (a can of spam and two K-rations), with the three boatmen eating a little extra.

Wednesday, December 23rd

Got up at 7:15, got the boat ready and started carrying it. The wind was pretty strong, and the boat was heavy, so we had a pretty hard time of it. We didn't get to the water until noon, and then it took quite a while to find a launching place. We never did find a good one, but the boat was finally launched at about 1:30. The wind was pretty strong. We intended to push them off shore, but they (Lieut. Janssen, Lieut. Josephson, and Sgt. Nolan) appeared to be making some headway to the south the last time we saw them. We had a hard time of coming back against the snow. We ate some peanuts and a caramel, and went to bed.

Thursday, December 24th

Christmas Eve, and we've been here 2 weeks today. It was lonesome here with just the 4 of us, but we got up pretty early and dug out the gas strainer so we could make a fire. It was so windy that we couldn't work outside, so we dried out blankets, etc., inside. Golm had a badly blistered and swollen hand which had to be doctored. We stretched out our eating to cover most of the day. We had a sardine sized can of kippered herring with crackers, a spoonful of peanuts apiece, a black cough drop, and a caramel apiece. A cup of Bouillon, a cup of grape drink and plenty of coffee, using the same grounds over and over. It's really surprising how much pleasure one can get from a small thing like a caramel, but we look forward to it with anticipation every day.

Friday, December 25th

What a Christmas. Mangin's feet pained him so much that we had to get up at 3:00. He was in agony before that, but was better after it, although his arches still pain pretty badly. Got up again at 9:00. Golm went exploring. I massaged Mangin's feet and Waywrench started fixing up the floor, which was in pretty bad condition from the fire. Later, we had to dig out the rear entrance to the ship to fix the window up. After that, we had a first aid session. I'm the only one who doesn't have anything wrong. Golm has a swollen hand, two blistered fingers, Mangin has two sprained arches, and Waywrench has a few blisters on his hand. We are about to eat our Christmas Dinner and then go to bed.

Saturday, December 26th

Had another swell day. The weather was perfect. Waywrench cleaned up the back of the ship, while Golm dug around in the

rear of the bombay, uncovering a can of fruit cocktail and a can of chicken a la king. I worked on Mangins' feet and did some odd jobs. Everyone is feeling better, and I hope that Mangins will be up in a few days. We aren't starving by any means, but the conversations are mostly about food. You surely can remember some good tasting things.

Sunday, December 27th

Started today as usual by treating the casualties. Maggini's feet were better, but we found a big blister on each foot. Golm is losing the skin on one finger, including the nail. Golm and Maggini spent the day drying blankets; Waywrench finished cleaning out the back of the ship; and I climbed the mountain to see if I could see anything out to sea. I also took a roll of film. The weather has been perfect with the barometer reading 30:45 for more than 24 hours, but it started going down this P.M., and the wind is trying to pick up. I hope the weather stays good, though, because we still have plenty of work to do. The enforced diet is beginning to tell on us, but we will eat a little more tomorrow. Waywrench spilled some coffee in the fire. It exploded and burned the underside of the aileron off.

Monday, December 28th

This has been a terrible day. The wind started up early in the morning and has kept us inside all day. We had 2 fires, which took the rest of the day to repair. Mangins feet are quite a bit better. As soon as he can, he and Way will start working on the put-put again. We may be able to get that liaison set going yet. In the meantime, we can feel the effects of the short rations more every day. We pray almost constantly that the boys in the boat will get through and get help soon.

Tuesday, December 29th

Today has been just average. The wind has been blowing, but not too much. Maggini's feet are almost back to normal size now.

Note: The following is in a different handwriting, and seems to be written by someone whose mind is deteriorating, at the best.

Yet, if the taste of kisses went and strawberries came the year around, half of joy would be gone from the world. There is no wonder we kiss, for when mouth comes to mouth, in all its silliness, breath joins

breath, and taste joins taste, warmth is enwarmed, and tongues can move in a soundless language, and those things are said that cannot find a shape, have a name, or know a life in the pitiful faults of speech. There is nothing to be done with the ear, so back we come to the mouth, and we kiss with the mouth because it is a part of the head and of the organs of taste and smell. It is temple of the voice, keeper of the breath, treasurer of tastes and succulences, and home of the noble tongue. And its portals are firm, yet soft with a warmth of a ripeness unlike the rest of the face, rosy, and in women with a conkling red tenderness to the taste, not to compare with the wild strawberry feeling, and too far from the organs of taste and smell, and far from the brain, and an arms length from the heart. To rub a nose like the blacks is better, but there is nothing good to the taste about the nose only a piece of old bone pushing out of the face, and a nuisance in winter, but a friend before meals and in a garden indeed. With the eyes we can do nothing, for if we come too near, they go crosses, and everything comes twice to the sight without good for one or all five, no angles with a flaming world, yet this it was that left the grapes to weeds. I had eaten of the tree; Eve was still warm under me. There is strange and yet, not strange in the kiss. It is strange because it mixes silliness with tragedy, and yet, no strange, because there is good reason for it. There is shaking by the hand, yet a shaking of the hand is not speech. The hand is too hard, and too used to doing all things with too little, and deeper and closer.

He and Waywrench started to work on the put-put, and may have found the trouble. We'll know in a few days anyhow. Today's eating consisted of four pieces of hard candy, and 3 dates apiece, a can of chicken a la king, a soda cracker apiece, a tablespoon of peanuts, coffee, and a cupfull of lemon extract.

Wednesday, December 30th

Today was overcast with snow showers. Spent most of the day working on invalids. Golm lost one fingernail, and may lose another. I'm just thankful that his hand doesn't pain him. Worked a little on the put-put and made some progress, but it was too dark to work much. Got up a game of 500 rummy, which everyone seemed to enjoy. Had a delicious meal of a can of mushy apple juice and a can of tomato juice, of which we made a good soup by adding cracker juice. The boys have been

gone a week today. God grant that they still are going strong.

Thursday, December 31st

Today has been overcast with occasional light snow. (Barometer 30.3). But we had an enjoyable bull session about food, and got quite a bit done on the put-put. Maggini put on a pair of shoes for the first time in a week, but his feet are still weak. Colm's hand is improving. The gas gave out on his side, so we had to start digging out the other side. I hope we can figure out how to transfer the gas to this side, but will have to wait until tomorrow to see. Meanwhile, we will eat an early supper, and get to bed to save gas.

Friday, January 1, 1943

Happy New Year. It snowed and blew all night, and kept it up all day, so, since we didn't have any fire and couldn't do any work, we stayed in bed. Our meal consisted of half a box of chocolates, since we couldn't heat anything. We didn't have anything to drink, so we didn't feel very good.

Saturday, January 2, 1943

More wind and snow all night. It slacked up a little, around noon, so we got up with the aid of a fire in a peanut can. Waywrench got the prop anti-deicer tank out with about a gallon of alcohol and glycerine, and I dug out the oil drain. After that, we had a couple of small hot fires and made plenty of hot coffee and had a lemon powder and a cup of bouillon. Our main dish was the last can of date nut roll with jelly, and it was very good. We didn't finish with the eating and drinking coffee until almost 6:00. Then I worked on Maggini's feet and we went to bed. There is quite a bit of loose snow outside, but the very shape of the ship keeps it fairly clean. It actually rained for a while today, but I don't know what effect that is going to have on the situation. The boys have been gone 10 days today, which is the time we figured it would take them to make the trip. We are praying that they made it all right, and can bring help soon.

Sunday, January 3, 1943

There wasn't much wind last, so we thought that we would have a good day, but the wind picked up and it snowed all day. The ship has a sheet of ice on it, and is covered with snow. Besides that, the drifts around the ship are higher and closer than they have ever been before. We hooked up the hand fuel transfer pump, and I am positive we pumped some gas over to

this side, but we couldn't get it out, so we had to use the alcohol to cook with. I got in too big a hurry once, and caused a fire in which I burned my hand, but not badly. Now we are all wearing bandages. I found 2 bouillon powders in the radio operator's desk. Spent a lot of time putting snow under our bed. There was quite a hole there, so we ought to sleep better tonight. It must be raining outside now, because this plane is leaking all over, and we have only a small fire, so it couldn't be melting ice on the wing. We keep praying for clear weather, and the hope that the boys got through - also to try out a new theory as to the location of the town of Hebron.

Monday, January 4, 1943

Had blue sky when we got up, but it stayed overcast all day. There wasn't much wind, however, so we were able to work pretty well. Waywrench and I got quite a bit of gas out of the other wing, so we are pretty well fixed on that. Maggini has the put-put almost ready to try again. We are just praying for good weather, both in the hopes of a rescue plane (if the boys got through), and to try out our theory as to the location of Hebron. Meanwhile, I am cutting down still more on the rations. We would already have starved, if we didn't have plenty of coffee. Finished everything we could do early tonight, so played another game of 500 rummy, which Maggini won.

Tuesday, January 5, 1943

It started off like a beautiful day, but turned to a light low overcast. Way and I cleaned the plane of snow, and Maggini finished the put-put, which seemed to be in pretty good condition. It started clearing up in the late afternoon. Played another game of 500 which Waywrench won.

Wednesday, January 6, 1943

This is the 8th successive day of bad weather, and it has been two weeks since the boys left. The wind was worse last night and today than it has ever been before. We are plenty snug in here, but the entrance is almost full and it doesn't do any good to dig out. We stayed in bed until noon, because it was impossible to do anything. Played Hearts for a change - Maggini won. We each had one cough drop, $3\frac{1}{2}$ dates, about a level spoonful of peanuts, and some coffee - that's pretty poor eating for a whole day, but the boys are really taking it swell. We talk about food a lot, but the spirits are still high in spite of the bad weather.

Thursday, January 7, 1943

We've been here 4 weeks today. The entrance was blocked up this morning. As I was going in the ship, I heard a noise and saw a little bird. We caught him, boiled him for a couple of hours, then made a stew by adding a bouillon powder - it was really delicious. Golm started to go looking for Hebron, but the snow was too soft. Maggini got outside for the first time in 13 days. If we can't find a town, or get the put-put going in three days, all we can do is wait for the weather to clear, and pray that the boys got through, because we will be too low on food to do anything else. God help us to find some way of getting out of here safely.

Friday, January 8, 1943

Today was the most strenuous for me since we got here. I tried to get to Hebron, and still think I know where it is, but there are 2 mountains in the way. I can feel myself growing weaker, and we have less to eat every day. I don't know what we would do if we hadn't had the 3 pounds of coffee. We sit around and drink that, and talk about all kinds of food, but I think we all crave chocolate candy more than anything else. The boys dug out the back of the ship, so if tomorrow is clear, we will have one last try with the put-put and the radio.

Saturday, January 9, 1943

Well, we got the put-put back in place, but it jammed again, so that leaves us with one possibility - that the boys got through. We had a perfect day here today, but are hoping that the boys are at Goose and the weather was that bad there, too. We don't have more food than for one good meal, but we are going to stretch it for 6 days. The boys here were down in the dumps today when the second of our 3 chances fizzled out in 2 days. But they seemed to have squeezed out of it pretty well. Al dried the blankets and remade the bed.

Sunday, January 10, 1943

We've been here one month today - 31 days. Spent most of the day, which was perfect as far as the weather was concerned, looking for the plane, and fixing up bandages. The boys' spirits were much higher today, especially after our little church service. Our only food today was one slice of pineapple and 2 spoonfuls of juice. Played a couple of games of hearts before going to bed to pray that the boys got through, and that they will bring us food soon. If we don't live to

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eat all the things we talk about, will have at least mentally eaten some of the best meals in the world. God grant that we get out safely, though.

Monday, January 11, 1943

Our 3rd day of perfect weather. Also the coldest day since right after we got here. Spent the day watching for the plane which didn't come. The oil gave out on this side, which brings up another problem. Our ration for the day was 1/8th can of Spam and a soda cracker apiece. The short rations are beginning to tell on us, but we are still in high spirits, and have plenty of hope. Had another "church" service, which did us all good. Spent a couple of hours arguing and discussing the respective merits of different candies. Rank was Hershey's Almond, Nestles, Baby Ruth, and Heath Bar. With Milky Way and Whiz coming close.

Tuesday, January 12, 1943

Today was the boys 20th day - our 33rd - and was overcast, but calm. We got the oil almost dug out, but are all so weak that we can hardly work. The boys' spirits are still high, though, and we had a couple of lively bull sessions on our one topic of conversation - food. Our rations today was a slice of pineapple.

Wednesday, January 13, 1943

Another calm overcast day. We dug up the oil, dried out the blankets, made a new bed of snow, and ate our last solid food - a slice of spam and a soda cracker apiece. All we have left is a half of pound of chocolates and three drink powders, but we talk like rescue was a certainty tomorrow. It cleared off late this afternoon, so maybe there is hope for tomorrow.

Thursday, January 14, 1943

Clear day but with wind. We cleared off the plane and waited, but nothing happened. Late this afternoon, we were playing cards when Way-ranch poured the gas too fast, which caused an explosion which burned both his and my face, hair and hands. Our ration was four chocolates, but we are still working out pretty well. After a little devotional, we went to bed.

Friday, January 15, 1943

A perfect day as to weather, but the coldest since we got here. Spent most of the day trying to keep warm, and listening for a

plane. Also made big plans for a couple of days in New York when we get our furloughs. Ration was two chocolates and a bouillon powder. None are particularly hungry yet, but we are all getting weaker and colder because our bodies aren't putting out enough heat.

Saturday, January 16, 1943

Another calm, clear day, but the coldest we have had yet. The oil froze up, so we had to end up by burning nothing but gas. Ate the last thing even resembling food (two chocolates apiece) which leaves us with one bouillon powder and 2 sticks of gum. The strain is beginning to tell, but we still have good bull sessions about food and a furlough in New York.

Sunday, January 17, 1943

Couldn't have asked for better weather, except that it was so cold that the oil and hydraulic fluid were frozen, and wouldn't run, so our gas is going pretty fast. Had our last food - a bouillon powder, so unless rescue comes in a few days -----The boys have been gone 25 days, which is a long time, but they are still our only hope. Our families will really miss some good eating if we don't get out of here, because in our conversations of food, we have really worked out some swell dishes and menus.

Monday, January 18, 1943

Cold and clear - my watch stopped, so we didn't get up until noon. Must be a little warmer, because we got a little oil. Today was our first completely foodless day, but spirits are still pretty good. It's surprising the amount of punishment the body and mind can take when necessary. We are still in pretty good physical condition, though rather weak, and are still able to talk cheerfully of food and home, though there can't be too much hope left.

Tuesday, January 19, 1943

Cold and clear. Let the oil run all night and got enough breakfast (hot water - special coffee). Didn't get up until almost 1, so didn't have a very long day. Had another almost disastrous fire, but made out with the loss of one cushion.

Wednesday, January 20, 1943

It snowed and flew pretty hard last night, but we all slept

pretty well, and were much more cheerful today. We stayed up longer than we should have though, and are pretty tired. The snow has been blowing pretty hard all day and is piled up in front of the door, so I don't know what we will do if it doesn't stop pretty soon.

Thursday, January 21, 1943

6 weeks today - had a rough night with rain and snow, so everything inside was soaked when we got up. Only Waywrench and I got up, and then only long enough to melt some water. Things could still be worse.

Friday, January 22, 1943

Got up around noon and were up until about 6. Cleared out the entrance and made the bed. The weather seems to be clearing, after three days of bad weather. We could stand some good weather.

Saturday, January 23, 1943

Spent a miserable night - everybody was crowded and nobody could get comfortable. Had a good day but everybody is getting pretty discouraged, although the conversation was pretty good. We haven't really felt famished, but we really are weak. It gets me to see the boys start to do something, and then stop for lack of will power to go on. Waywrench has developed a case of piles, which is bothering him a good bit.

Sunday, January 24, 1943

Had a miserable night, but perfectly clear day. Got up at 1:30, shot the bull, drew gas, and went to bed at 7:30.

Monday, January 25, 1943

Cold and clear, better night, but still pretty bad.

Tuesday, January 26, 1943

Overcast but fairly calm. Each day, we don't see how we can last another day, but each time we manage to go on. We all smoked a pipe of tobacco this morning, and Gorm really got sick and I felt pretty bad, but we came out of it pretty well.

Wednesday, February 3, 1943

Spent a solid week in bed. Today Waywrench died after being

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mentally unbalanced for several days. We are all pretty weak, but should be able to last several more days at least.

Note: This is the last entry in the diary. The men were found in the first part of March by Eskimos from Hebron, which was actually only about an hour and a half away by foot.

LIST OF FOOD WHEN WE LANDED

| | |
|----|---------------------------|
| 7 | cans of Spam |
| 3 | cans of peanuts |
| 8 | cans of chicken a la king |
| 2 | cans of pineapple |
| 3 | cans of fruit cocktails |
| 2 | cans of date and nut roll |
| 1 | can of brown bread |
| 3 | boxes of chocolates |
| 28 | Hershey bars |
| 4 | packages of dates |
| 1 | pound of soda crackers |
| 1 | pound of cheese crackers |
| 4 | boxes of fig newtons |
| 1 | case of coca-cola |
| 2 | cans of salmon |
| 3 | pounds of coffee |
| 20 | packages of caramels |
| | Odds and ends of rations |

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REPORT OF PRIVATE TUCCARONE RELATIVE TO EXPERIENCES
OF PERSONNEL FORCED DOWN IN THE ARCTIC

Departed Monday, November 9, 1942, in search of transport plane that had been forced down on the ice cap. Departed said station at approx. thirteen hundred GMT and had been flying about two and a half or three hours when accident occurred. We had been flying over water approximately half an hour when we decided to turn back to the base. Approx. fifteen minutes later while over the ice cap we were making a slight left bank. At that point, the left wing tin struck the snow and ice and as a result the plane was pulled down. The plane slid and careened about three hundred yards judging from the wreckage we could see strewn over the area. At the time of the crash Pfc. Tucciarone, and Pvt. Spina, Cpl. Howorth, and Pvt. Wadell were in the radio compartment--Lt. O'Hara was in the pilots' compartment with Lt. Monteverde and Lt. Spencer. Tech. Sergeant Pest and Staff Sergeant Puryear were in the navigator's compartment. The crash came as a complete surprise to all aboard. There was a heavy blowing snow at the time and no one realized we were anywheres near the surface.

The plane was twisted completely in half at the radio compartment. The only apparent injuries at the time of the crash were: a broken arm suffered by Pvt. Spina, an eye injury suffered by Pvt. Wadell, and slight chest injuries suffered by Pfc. Tucciarone. Sgt. Best received a slight cut on the head as a result of being thrown through the glass in the nose of the plane.

We rigged a tarpaulin over the open end of the tail of the plane and secured for the night as the wind and the snow was blowing very hard. The first aid kits were used and the injured men were treated as well as possible. We had no sleeping bags, stove or anything to use for heat so we cut up the parachutes and used them for covers. The radio equipment was severely damaged and strewn about. We used the emergency transmitter with the hand generator and the aerial was tied to the kits. We used this the second day and each day thereafter when the wind wasn't too strong to tear up the kite. We never knew if anyone was picking up the distress signal or not.

We could see water to the south of us, and on the third day Lt. Spencer and Lt. O'Hara decided to walk over that way and examine any possibilities of rescue by that source. About fifty yards from the plane the crust on the snow gave way and

Lt. Spencer fell into the crevice. We judged the crevasse to be about one hundred feet deep from the length of the rope we used in rescuing him. We had a little on the plane and had to tie it on with parachutes shrouds in order to obtain enough length to reach him, at his suggestion we lowered him a parachute rigging and he strapped that around him. After about three hours we got him out. He suffered no apparent injuries except one frost bitten hand at that time. That put an end to our hopes of walking very far from the plane, for after closer observation we noticed that the crevasses were very numerous and coated with very thin layer of ice and snow that had drifted over them.

We had three cartons of rations that were safe. When the wind was not too strong we would burn gasoline and try to warm up that way. We moved around as much as possible and were kept rather busy scooping snow from the plane so it would be possible from the air to see the plane. This we did with the paddles from the life rafts. A large crevasse opened directly behind the plane, and about half the tail section was over the opening. The plane seemed to drop a little further into the crevasse each day so we secured it as best we could to the other section of the plane with rope that was in the mooring kits.

The radio equipment was so completely wrecked and scrambled that we all thought it hopeless to fix but Corporal Howarth gave it a try. The weather was usually so bad that he could do very little, but with Pvt. Wadell's aid he did a swell job and about the tenth day he made radio contact.

It was fifteen days before we saw or heard any sign of a plane. On the fifteenth day the C-54 flew over and dropped rations and clothing and sleeping bags. The wind was blowing very hard that day and we retrieved only a small part of the equipment dropped. Rubber footwear seems to be the best wear because the snow will melt off the rubber and not freeze. All the fellows wore some kind of rubber footwear except Sgt. Puryear who was wearing leather high tops at the time. The snow clings to them and then freezes and it's almost impossible to keep the feet warm. We could remove our footwear at night and rub our feet trying to keep the blood circulating.

On the nineteenth day the plane of the Northland flew over and landed about two miles to the north of our plane. At the same time another plane was dropping supplies to us. The weather was better that day and all of the supplies dropped were retrieved. Lt. Pritchard, pilot of the Grumman from the Northland walked over to our plane and told our pilot that he could take two men out with him, and asked our pilot which two he

wanted to go. Of course Lt. Monteverde said he wanted to get the men who were worst off out first. Those were Lt. O'Hara and Pvt. Spina. Neither of them could walk and we had nothing to rig up a sled with. It would have been impossible to carry them over the snow and around the crevasses, as we were all weak from exposure and exhaustion ourselves. It was getting late then so he told Puryear and Tucciarone to go with Pritchard. Lt. Pritchard and his radio man Bottoms then led us across the snow and around crevasses to his plane. Lt. Spencer came along to help him to dig the snow away from the plane. They dug the snow from around the plane and he retracted the landing gear and turned the plane around. He made a beautiful take-off down wind and Lt. Pritchard and his radio man Bottoms delivered we two very fortunate fellows, who can never be thankful enough, safely aboard the Northland. The other fellows when we left them were in seemingly the same condition as us; frost-bitten hands and feet except Lt. O'Hara who was sick to his stomach all of the time and gangrene seemed to have set in both feet, and Pvt. Spina was suffering from a broken arm, frostbitten ears and an injured left arm.

ALEXANDER L. TUCCARONE,
Pvt. 1cl., Air Corps,
Asst. Engineer

TRANSCRIPT OF INTERVIEW WITH
CAPTAIN ARMAND L. MONTEVERDE
FERRYING DIVISION, A.T.C.
April 26, 1943

Present: Lt. Colonel William S. Carlson, AAF Plans;
Captain Monteverde; Captain Oliver La Farge,
Historical Officer, A.T.C.

Captain La Farge: A C-53 was apparently down on the Ice Cap
on the 5th of November?

Captain Monteverde: That is correct.

Captain La Farge: At the time the search began, there were 7
B-17's being ferried by the Wing according to this. When
did your particular ship start in searching? Where were
you stationed at the time you were put on this?

Captain Monteverde: I was at B-1 and went on the search the
6th, the 7th, skipped the 8th due to weather and the 9th
went on the search.

Captain La Farge: You simply were ferrying this ship through?

Captain Monteverde: Right.

Captain La Farge: Well, now, we will start at the 9th.

Captain Monteverde: Well, it had been reported to me that the
flares had been seen from Ice Cap Station on a heading of
about 39° North, magnetic North from there, so I flew
across the Cap from One on a heading toward the Ice Cap
Station about thirty miles south of the Ice Cap Station--
southeast, I believe. I encountered weather the top of
which was 7,000. As I had been flying over it, I knew
what the top was, so I flew approximately over the Cap
Station and back and down and around the weather and
underneath it to try to get back to that heading from
the Ice Cap Station. I had been skirting the weather
and heading north and decided to turn because of the bad
weather.

My left wing struck the ground which was quite a surprise
to me as I felt I was at a safe altitude which I would
judge being about fifteen hundred feet, and my first im-
pression was when the ship struck was that a turbo-
supercharger had blown up or that something had gone wrong

with the engine to begin shaking like it did. Of course, that was all a fleeting impression. Immediately, the plane slid on the surface and came to a stop with a broken tube.

Captain La Farge: Were you further inland than you thought you were?

Captain Monteverde: I knew how far inland I was. But, still it was right to go by the horizon--regardless of how it is under, it will never be higher than the horizon. That is how it should be, but that doesn't go up there.

Captain La Farge: Here is what we had on that. This is from Tucciarone--that a heavy wind was blowing the drifting snow and the visibility was poor if not nil.

Captain Monteverde: That is incorrect because the drifting snow would only be a twenty-five-foot drift above the Camp. You don't fly 20 to 30 feet from the ground in a big ship like that.

Captain La Farge: You were having poor or no visibility?

Captain Monteverde: No, in places I had unlimited visibility.

Captain La Farge: When you hadn't?

Captain Monteverde: No, I could still see the horizon. I was never on instruments.

Lt. Col. Carlson: It is quite a common phenomenon to have no depth perception. In traveling in it, it is something like going through milk. You might relate the experience which you had when digging for a box because I think that illustrates what the lack of horizon will do.

Captain Monteverde: By way of explanation, I recall a ration box, a box about one by three feet square had imbedded itself in the snow and I was digging around it and I got a little tired and stood up to rest my back and fell down. It was on a snowy, hazy day and I felt kind of foolish, so I did it again and started working around and digging it out and I almost fell down the second time. That was because I couldn't tell exactly when I was standing straight up. The only way I could tell was by looking at the ship which gave me the vertical and horizontal.

Lt. Col. Carlson: Very often traveling on the Ice Cap, I have

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had the experience of traveling with a person,--Fitzsimmons relates this, too--you take your eyes away from him and think you are going in a straight line and when you turn your eyes back, you lose the focus. It is a problem of visual perception. There are no trees, nothing with which we are familiar to give us depth.

Captain Monteverde: That also happens to experienced people.

Captain La Farge: I have heard that but you bring it up more dramatically.

Lt. Col. Carlson: This is a story of a FBY flying up there in contact weather. This FBY was flying along and the pilot thought he was in normal flight when he felt as though the plane were dragging and he looked at the speed indicator and found himself going only 35 miles per hour and actually had landed on the Ice Cap. That sounds perfectly preposterous, but nevertheless the plane is still up there as proof. He made a landing without knowing it.

Captain La Farge: When she came to rest she was broken?

Captain Monteverde: Broken in two and the first thing I did--this drifting snow gave me the impression the ship was on fire, so in less time than it takes to tell, I was out side of the window and dove out of there and saw a man lying between the port engines and there was quite a bit of blood on the snow, and thinking that the ship was on fire, I rushed over there and started dragging him away from the ship, in the meantime, realizing that it was drifting snow and not smoke and fire.

Captain La Farge: That is where Tucciarone got the impression.

Captain Monteverde: On the ground, visibility was zero with the drifting snow, so then I realized the ship wasn't on fire. I went around to get some help to drag Spina inside of the fuselage and out of the freezing weather.

Captain La Farge: Now, did Spina go out through the bombardier's compartment?

Captain Monteverde: Through the side of the ship. When the ship came to rest, it was sliding toward the left wing and heading north.

Captain La Farge: And he came out through the break?

Captain Monteverde: Yes, and Sergeant Best was thrown through the Plexiglass nose and received lacerations about the head which has connection in the story later on as you will see. I thought that his head abrasions might have been a skull fracture and incident to his losing his mind later on.

Captain La Farge: I have down here that Spina had a broken right arm and his left arm was hurt.

Captain Monteverde: No, he broke his right wrist and both hands were frozen.

Captain La Farge: Did that happen at the time or later?

Captain Monteverde: Right then before we got him in the fuselage and both feet frost bitten, concussions about the head, and severe lacerations on the hands, too, so Lt. O'Hara and I carried Spina in and the other boys went about recovering all the rations and getting all the insulation, cushions, blankets, tarps, etc., so as to make ready for the night.

Captain La Farge: Which part of the fuselage did you go into?

Captain Monteverde: Aft of the radio compartment. The forward part is a bomb bay, so right at the bottom turret--that is where we lived, in the bottom turret. I gave first aid to the other boys and I set Spina's arm, and I covered the end of the fuselage which was open and filling with drifting snow with a tarp we had. The drifting snow made it very difficult as it is very penetrating and will go through seams in clothing, and that, added to our misery, that night was _____. We made Spina as warm and comfortable as possible that night as we could with a few blankets we had and the cushions and the rest of us just hugged each other and got as close together as we could, and every now and then moving our feet trying to keep our feet warm. We found out later that when O'Hara was helping carry Spina in, snow got in his boots and he didn't dry them out. The wind blew that night, I believe, and the following day, all day, we couldn't go outside. We ate snow. I didn't allow the men to smoke because the bomb bay tanks had broken and spilled all the gas and there was a considerable amount of gasoline and fumes around. Anyway, we ate snow for water. After shock, I believe that a man wants water and when you eat snow, it seems to make you thirsty so we had a pretty miserable time. Well, the wind blew three days, and the third day, I hadn't slept much,

and was sleeping at dawn when Lt. Spencer and O'Hara went out to look over the situation and I recall Lt. O'Hara calling for help, and without even waiting to tell what had happened, we went to the crevasse where Spencer had fallen in.

Captain La Farge: Had you seen the water before they went out on that walk?

Captain Monteverde: I don't recall.

Captain La Farge: The reason I ask that again is that they saw the water on the eastward and Lt. O'Hara--

Captain Monteverde: It is to the south.

Lt. Col. Carlson: Yes, I believe Spencer said he saw water and thought he could walk out to it.

Captain Monteverde: But it would be south because the Bay curved in. Would you like to hear the story of how we got him out?

Captain La Farge: Yes.

Captain Monteverde: Well, I laid down as close as I could to the crevasse, and hollered down and he said he was okay, and I said, hold on as long as he could; I would get a rope to him, and we fed the rope down to him and I could barely hear him when he shouted at the top of his voice and vice versa. I let the rope down to him and had him make several tries and he couldn't move either way because he landed on a block of ice, and had he missed that, he would have gone on and we never would have gotten him.

Captain La Farge: How wide was that crevasse?

Captain Monteverde: I would say about fifteen feet wide. It was smooth surface except where he broke through. I finally got the rope down to him and it took all of us to pull him up because the rope would cut through the lip of the ice, and everyone but Spina was doing the pulling that day, even Sergeant Best despite the fact that he had been vomiting and had been quite ill for two or three days. We got him up right close to the edge and couldn't get him all the way over because the rope had cut into the ice, and he said he had tied a bowline and put it around his waist and under his armpits and he felt as though he were going to faint, so we let him back down

on the ice, that block of ice that was wedged in there and we sent him down a parachute harness and also a jungle knife and we let the rope down to him, had him tie it on to the parachute harness and lifted him up as far as we could and he dug up and I dug down toward him and using the ship's ladder, we were able to get him out.

Captain La Farge: That is the way Major Rust described it to me. He said they had a picture of him with that knife.

Lt. Col. Carlson: I have a picture of those crevasses--not the one he fell in, however.

Captain Monteverde: The day after that we had a pretty good feed. I let the boys eat a full ration apiece, I believe.

Captain La Farge: What did you have on board in the way of rations?

Captain Monteverde: We had two and one-half boxes which we lost. I would say a half of a box of C rations--field rations.

Lt. Col. Carlson: Have any sleeping bags?

Captain Monteverde: No sleeping bags and no extra clothing and no primus stoves of any kind nor cooking utensils and nothing but flying equipment--winter flying equipment.

Lt. Col. Carlson: You were wearing your ordinary dress shoes with your flying boots over them?

Captain Monteverde: Yes, sir, winter flying equipment, not Arctic flying equipment.

Captain La Farge: You had these jungle kits aboard?

Captain Monteverde: On the parachutes, yes.

Lt. Col. Carlson: He didn't have an Arctic kit.

Captain Monteverde: No Arctic kit whatsoever.

Lt. Col. Carlson: What of the jungle kit in addition to the knife was of any use?

Captain Monteverde: We used the mosquito netting as a strainer to separate the sugar from the tea which was all mixed up (when it dropped later on).

Lt. Col. Carlson: Did you use any of the ointments?

Captain Monteverde: Yes, we used some of the medical aid equipment, boric acid equipment and stuff like that, and I was very, very ignorant of Arctic first aid and made the very common mistake of rubbing a frozen member.

Lt. Col. Carlson: I think it highly significant that Capt. Monteverde set Spina's arm and when he got out, he was taken to a hospital and it was found that it did not need to be reset.

Captain Monteverde: That was just luck there. That night Lt. O'Hara told me that he thought his feet were frozen so he took off his boots and his feet were frozen solid. Just to add what impression it gave me, we used to walk up on the fuselage balancing ourselves on the machine gun butts on each side. That machine gun butt was naturally very hard and cold. That was how his foot felt--just a solid cold. Well, I put his feet under my arm-pits and rubbed them for two or three hours and they began to soften up and I think the next day, they started to turn all colors of the rainbow--blue and green and purple, everything like that.

We hadn't thought much of the radio because it was broken up. However, Howarth, got the radio, which he and I finished tearing off the wall where it was just hanging by a few threads and stuck it alongside of the fuselage as insulation for the fuselage. He took this same set, the liaison set, and put it together when they left and thawed it out. It was full of ice, and they thawed it out with the signaling light. That is showing a lot of ingenuity, because I hadn't thought of that by any means. He got that radio to working on the eighth day. All during this time, when the weather permitted, we used the emergency set. We wind a crank and let out a kite which automatically transmits SOS and MO's about our position. We didn't have the receiver working that day. Two days later, he got the receiver working. It was very fortunate that we found a Tech Order on it and were able to join the correct wires together. There was a maze of wires coming out of them. Two of those wires had to be connected so we found the Tech Order, the proper one. All of them had been scattered all over at the time of

the crash. Luckily we found that one and were able to get the receiver working so that we knew they had received our message and they asked us for our position. My position wasn't too clear because I had been flying by code and very much of that code is identical and I gave our position, I believe it was 20 miles west of B-2.

Captain La Farge: Yes, "on or at the west leg of B-2--about 20 miles from B-2." (Reading from message log.) Were you picking up signals from that range?

Captain Monteverde: Yes. I'll tell you why. One time I listened to that range on our receiver with no background. It meant that I should be in the Northwest quadrant according to their maps. The maps were opposite section which we found out later, but then again, another time, I listened to the radio and I didn't believe that darn range at all. Of course, it was not to be used as a position—it was only a home range.

Captain La Farge: It should have given you an actual directional line.

Captain Monteverde: Our direction finder on the ship was torn off because it was on the under side of the ship, but it sends out and one time I was on the beam and another time, I was in an entirely different quarter. The beam had swung, you see, over that terrain. Well, that range, it was told to us was not to be used as a beam. I knew, but being an emergency, I used that to give me some idea, so whenever the weather permitted, the men stood watch outside. All took turns standing watch for any airplanes that might pass over.

We took the bombsight out the box and used the box for a stove and used the gasoline in the ship for fuel and any clothing we found, we used for warmth. We cooked outside and heated rations and made bouillon soup and coffee outside.

Captain La Farge: Before you get too far ahead, there are one or two things. Wasn't it at the time you were fixing the radio that you found the tail of the B-17 settling in the crevasse?

Captain Monteverde: That is correct. Of course, we knew we were over the crevasse but that was quite a ways from the back door. We could come out of the door safely and walk around in there, but during the night, we could

hear rivets popping and Private Waddell figured that the ship was sliding into the crevasse and we tied a rope from the aft section that was broken to the forward part to try to keep them together. We tied all kinds of rope and took up the slack by twisting them.

Captain La Farge: During this time, am I correct in understanding that you had a great deal of wind?

Captain Monteverde: Naturally, when the wind was blowing very hard, we couldn't go outside and work because you would get frost bitten feet or hands or your face--whatever was exposed to it.

Captain La Farge: Was there a good deal of that?

Captain Monteverde: Certainly a good deal of that. In fact, it was usually about five days out of seven. On snowy days, we would go outside as it was fairly warm and we knew no airplanes could see us, so we spent that time improving our condition as best we could.

I think Corporal Howarth thought of digging a hole and living in a hole at that time, but we had no knife in the mess kit and it would be pretty tough doing that. Well, about the fifteenth day, we were sitting--shall we go from there?

Captain La Farge: Yes.

Captain Monteverde: Believe me, it was a very happy day when we saw the C-54 overhead. There is a rather amusing incident connected here--when Spina and O'Hara were lying across the fuselage, we would have to walk over them and say, "Is that right? How is that? This way?" etc. We could walk through the fuselage very cramped and trying to sleep like that isn't very comfortable. However, when an airplane came over, we heard it, and we had flares ready and a man outside. Everybody just tore over Spina and he didn't mind it at all, either, to see that C-54, and they dropped the supplies, and we didn't get a good supply of sleeping bags which we gave to Spina and O'Hara and made them more comfortable and were able to keep them fairly warm after that.

Captain La Farge: According to the C-54's report, I think it is their report, there was a narrow area around the head of the plane. If they missed that, the stuff was gone.

Captain Monteverde: Right. They dropped the supplies with chutes which blew away. They would land and slide as the chutes would never collapse, and then they dropped some stuff free-fall which we got some of the next day. We got very little the day they dropped it. The next day was snowy and hazy and we tied ropes to each other and went after those we would see and got quite a few of them the following day. Our rations the day we were found, I believe, we had about five days left were a cookie and a third of one K ration per man per day. We had a Coleman stove and it would not burn lead gasoline at all. It was an old type Coleman. There is a Coleman that burns lead type gasoline, but this was not the type they dropped us. They dropped us the fuel for this, but it broke and we didn't get any of the fuel.

Captain La Farge: Some of these things begin to come together now which never did before. Well, we are up to the 24th and 29th of the month.

Captain Monteverde: It was the 21st day after we were down. That is right--fifteen and six. It was the night of the 21st day that we saw Lt. Demarest approaching. We saw them when they were about three miles away. The night before they left their sleds at the Camp and they skied in that night. Lt. Demarest bandaged O'Hara's feet and looked at Spina's hand and thought that it was all right and bandaged his arm and they had a chicken dinner we had prepared for them, canned chicken, so they ate very heartily, that is, Sergeant Tetley and Lt. Demarest and they spoke a little while after--gave us a little war news which was nice to hear. Then they went back to their camps and stayed that night because there wasn't any room in the fuselage. They had all their equipment back there, so the next morning, the Northland radioed to us that the Grumman was coming over. The Grumman came over and dropped us a note asking (incidentally, that story is in the Coast Guard magazine for March--a Grumman story) my advice as to whether to land wheels up or wheels down or near the ship, or if it was a 60-40 chance of landing safely at all and I signalled back for him not to land at all--it was too dangerous. However, he landed, wheels down, and the ship almost nosed over, too.

Lt. Col. Carlson: That is the first landing of any type of plane on the Greenland Ice Cap.

Captain Monteverde: But you have to realize there that on

the Grumman, the wheels come out of the float itself and they bury the wheels. The wheels dug in the snow and the float actually took the brunt of the ship.

Captain La Farge: The ski formation probably kept the wheels from throwing her over.

Captain Monteverde: Correct, about the same time--I got the correlation wrong--the Grumman landed in the morning. That night Lt. Demarest skied up, so Lt. Pritchard walked through the crevassed area. He had landed about a mile and a quarter north of us and took him about an hour and fifteen minutes to walk down to us.

Lt. Col. Carlson: He almost slipped in a crevasse, didn't he?

Captain Monteverde: Yes, sir, he did, but was able to get out. He had a long pole like a broomstick sounding his way. When he came up, the first thing I said was, "You shouldn't have landed." He said that he had come prepared to stay. I think that is something that took a lot of guts, so I decided to send Tucciarone and Puryear because the injured men couldn't walk. We had no means of transporting them right then. There wasn't much daylight and I knew it took an hour and fifty minutes to walk down because Mr. Pritchard took longer than that to walk it and that would hardly leave them enough time to land in daylight, and I think he did land on the water by the lights of the ship. That is the way they made a successful take-off with Tucciarone and Puryear. The next day--now, here is where the sleds are approaching the Grumman is overhead, about 75 yards from the ship, I believe. The Grumman had already landed at the landing field about a mile and a half north of us and Lt. Demarest and the motor sled and two other sleds fell through the crevasse. I immediately went down there to the hole with some rope to see what we could do about getting him out. There was no sign of life whatsoever in the hole and the sled was wedged in the side of the crevasse about 150 feet down, so I sent Corporal Howarth up to Pritchard's ship to take off and to tell them what had happened to Lt. Demarest and to take off immediately because of the fog beginning to well up in the bay and also because of the situation and I thought I might need all of the men to get Demarest out, so Corporal Howarth went to the Grumman and the fog had come up, so that we did not see it take off. However, his take-off was successful because he passed overhead airborne 150 feet and waved his wings and we never saw him again. Well, that made Sergeant

Tetley a new member of our clan there. However, he had a lot of Arctic experience and was very welcome and very good.

We were pretty tired of K rations and immediately started to dig the hole under the wing which was later to be our home for several months. All of the boys started to dig the hole. We had one shovel which Tetley had brought with him, so we moved in the following night, I believe, to our new home under the wing and we were awaiting good weather for Sergeant Tetley to take Lt. O'Hara, whose condition now was very grave because gangrene had set in, to the Ice Cap Station. Knowing that he had gotten there in eight or nine hours in one day, I figured with a little luck, he could do it again, so on the 29th or 30th, what day it was that he left--I think it was 7 days after. It was on the 8th of December.

Captain La Farge: According to this, you were running low on grub again.

Captain Monteverde: Yes, on the day before they left, they got a couple of milk cans of food. That was very fortunate in that it held us over because the weather hampered the dropping of food and supplies after that, and I believe we were down to our last can of chicken when we got new supplies again. Well, after they left, it was a beautiful day, calm and clear. We never did know that they didn't arrive at the beachhead station--not until they came and told us. Waddell was lost about a mile north of the ship which we didn't know that day.

Lt. Col. Carlson: Waddell went along with Spencer and Tetley.

Captain La Farge: That's why the report on Waddell came in apparently late.

Captain Monteverde: Nobody knew Waddell lost his way until the Spencer, O'Hara, Tetley party was picked up. I'll tell you why I sent Waddell--the selection of men. I sent Lt. Spencer because he was able to navigate. He was a navigator and traveling up there is the same as flying--you have to use navigation. I sent Waddell because he was very able-bodied, a hard worker and mechanically inclined, to help with motor stuff--that is the reason for those men. I kept Sgt. Best because he knew where all the cooking utensils were and he was a good cook. Spina was still on his back and I had frost bitten feet and would walk only when I positively had to because

it was painful to my hands and feet. Thereafter, they dropped us supplies pretty regularly and kept us well supplied with everything but candles. We were always running down on candles. After Spencer, Waddell, O'Hara and Tetley left, the motor generator for the batteries did not like us and we never could get it to run. Incidentally, it had broken a piston in Presque Isle and they took it apart at the sub-depot and repaired it makeshift and gave it back to us. I tried to get a new one and was unable to do so. That is important because we lost communication and light on account of that.

Captain La Farge: Well, you got the motor sled out of your sight and some supplies dropped in on you and you are getting toward the middle of December.

Captain Monteverde: Well, we had no more radio communication. In fact, we didn't have an operator but we were able to talk with the Northland in code by reading the book on code.

Lt. Col. Carlson: Did Northland leave at about that time?

Captain Monteverde: We never did know because we lost radio communication before they left.

Lt. Col. Carlson: Would you like to say something about how you lived building that snow house under the wing and how the winds affected the snow house.

Captain La Farge: All my information during the period you were housekeeping came from people who had no direct communication with you. You might start with Christmas and work on.

Captain Monteverde: Well, first, my birthday, December 9th, came in there. Well, anyhow, we dug a hole down about four feet square and then dug under the wing and we dug a surface about four feet below the wing. We had a nice room in there and we had light. We took a dome light out of the fuselage and hung it on the wing and we used on the batteries charged with a putt-putt which we kept running. We had a regular switch light in there and had light when we turned the switch. Well, Sgt. Best did all, if not almost all of the cooking and whenever an airplane would come around and drop supplies, I would go outside and spot the supplies and go out and get them.

Captain La Farge: You were still cooking on the bombsight case?

Captain Monteverde: Yes, outside.

Captain La Farge: You didn't have that other stove?

Captain Monteverde: Tetley had a stove and he left that with us. We also had some light gas which Tetley had brought with him. The days are short and the nights very long and the only time you could really be warm and comfortable was when you were in your sack and as far down as you could get in your sleeping jacket which you completely closed around you for your breath to keep you warm.

Captain La Farge: It was this time you had some better clothing.

Captain Monteverde: They had dropped us heavy socks and things.

Captain La Farge: Did your own feet and hands get better during this period?

Captain Monteverde: About a month afterward, I was able to get up and be around without their hurting too much.

Captain La Farge: Go on, you are in late or mid-December.

Captain Monteverde: Well, January 2nd is a night I will always remember because we had a very, very strong wind. The wind was so strong it began eating away the ice blocks placed on the north wall. Whenever it would make a little hole through at night, we could feel it hit our faces--the drifts. We'd stuff burlap sacks, barracks bags, etc., in there but it would gradually get bigger and bigger. Well, I will retrogress to where I first felt the wind. I had gone to sleep early that night and had a very nice sleep and felt something cold on my head and I remember reaching up and touching this snow, and I thought I had slid up against the wall, and without even striking a match to see if I had slid down further, I forgot about it. I don't know how much later it was I felt the same cold and reached up and felt snow. I remembered having moved once and I scratched a match and I saw this pile of drift overhead that had seeped through a very tiny hole. The wind was making terrific noises, howling and beating and singing, just a loud noise, so we stopped up these holes as best as we could and moved over to the South wall and whenever we'd feel any drift, we would stop it up. This went on for quite a while and the drifts kept getting worse and bigger and we tried to stop them but were losing, so we put our bags at

the entrance of the tunnel and the three of us crawled in our bags and went to sleep. I believe I thought that was the end or last sleep for us. I got between the top and second blanket. The top was already frozen and would melt when your body would get in and freeze when you got out. I got in between the first and second blankets and I felt chill after chill passing over my body. However, when we woke up the next day, it was calm and clear and a nice day, so we immediately set about fixing the north wall which we learned from the drifts was the best thing to stop it, so we stacked it up from the inside--not from the outside because the wind would cut it. We made a wall level with the wing, so after that we had little drifts but nothing to worry about. Of course, during all that time, we knew that the glacier was moving and the fuselage was gradually slipping into the crevasse and that new bridges were forming and new ones opening up and sometimes we could even feel the movement of the ground and we used to keep that from each other. Here is where I would like to ask about Sgt. Best.

Captain La Farge: I understand that perfectly and I have no intention of putting in something that is going to cause a lot of sorrow to his family and a certain amount of shame to him. I want to know a little about that for my own information and knowledge. There is no need to put any of that down on the record.

Captain Monteverde: Well, Sgt. Best began showing signs of losing his mind, and I learned later--I didn't recognize it at the time--I thought he was talking in his sleep and later found out he wasn't asleep. His eyes were open and he seemed a long ways away. He talked very clearly but no correlation whatsoever. You couldn't make any sense of it and gradually it got worse until he finally got violent in that he thought we were fighting him and he would fight us.

The food was dropped pretty regularly during this time and we would get candles for a while but they wouldn't last long and we would always be short of candles and light.

Captain La Farge: Of course, you had a great deal more darkness than daylight.

Captain Monteverde: Right.

Captain La Farge: I see a great deal of this deals with the

different attempts to get at you people.

Captain Monteverde: I have seen reports. I saw Captain Turner's report and he was keeping everything. He has a log of the weather and a lot of interesting data. We heard about the dog team and they told us that it was fifteen miles north of us. He had to turn around because of the weather and losing dogs and things like that would boost our morale, and after a period of darkness and bad weather, our morale would be very low.

Captain La Farge: There seems to be a long period in here. A plane went over you on the 27th but was unable to drop any supplies because of the heavy wind but did drop supplies on the 28th.

Captain Monteverde: Right.

Captain La Farge: According to this, on January 6th--that would be roughly right, about eight or nine days later, supplies--

Captain Monteverde: I can't remember exactly when that was, but we did go 22 days without having any supplies dropped to us at all, but we had in reserve several boxes of C rations and we did get low, I began rationing it out. However, we ate quite well that day.

Captain La Farge: Whenever that 22-day period was, that was the time of wind and snow, I take it?

Captain Monteverde: Yes, always.

Captain La Farge: It must have been an area of very foul weather.

Captain Monteverde: It was where the wind would blow with terrific force and I believe up farther in the Cap, the wind was not of that velocity. It seemed to be compressed and fierce and increased in that area where we were down.

They dropped us walkie-talkies somewhere in there. However, Tetley had left us a walkie-talkie which never did work. It was on 4495 kilocycles. Then they dropped us a walkie-talkie which I recovered and found the aerial insulator had been broken and wouldn't work, so we took part of this other one and repaired the one so we were able to get fair communication with the walkie-talkie.

It wasn't excellent; you couldn't do it outside; you would press the transmitter down and it would freeze there and you couldn't receive. We found that by staying inside the hole, it was a lot better.

Captain La Farge: What communications did these people drop to you. Was it news about what they were going to do?

Captain Monteverde: They dropped us a few notes which raised our morale quite a bit on what the dickens was going on and all favorable stuff. They didn't drop enough of them. They dropped Sgt. Best some mail. It was worth very, very much and helpful in his recovery.

Captain La Farge: Was he the only one who got any mail?

Captain Monteverde: Yes.

Captain La Farge: Pretty good service. Is there anything more to fill in about your living conditions there or your life before the actual rescue?

Captain Monteverde: Yes. One part there we lost our Coleman stove. The generating unit was eaten away, and we were unable to fix it so it would work and that was when we were without supplies for 22 days, so the only way we could get our food warm enough to eat or even get out of the can was to put it under our armpits and between our legs and curl around it, and it would take 8 hours to get it out of the can before you could eat it. Of course, you would always get one or two that was bent and when it thawed out, would get in the bag and help the odors in the bag.

Captain La Farge: Was that the time you were in the dark?

Captain Monteverde: That was the time, the worst stretch I believe, we--to stay in six days and six nights. We didn't have anything to cook up. We had gasoline torches for flares which made everything black because we were using leaded gasoline which was poisonous, and we would be spitting black for days after. So I made the boys stop using it.

Captain La Farge: Was that along in February, do you suppose?

Captain Monteverde: Yes, it was.

Captain La Farge: I think it was that same period of weather

that slowed up the whole rescue. Do you think from your point of view that you have reached the rescue now? One thing we want to follow--how about the condition of Spina's arm?

Captain Monteverde: From the time of the crack-up, his condition improved. He had a badly frozen hand due to the poor circulation of the broken member and it was very painful to him all the time. I changed the bandages regularly and rubbed it with boric acid and he was a very good soldier and we got along swell. Sgt. Best, Spina and I got along very well. Sgt. Best was a very hard worker and Spina's temperament was such that nothing bothered him and we always figured we would get out of it.

Captain La Farge: So Spina did partly recover?

Captain Monteverde: Yes, he got up and was able to get around. After that we would take him outside and make him exercise whenever possible. But, as soon as a frost bitten member starts to get in the cold, it doesn't feel cold, it starts to ache. He would then crawl back in the sack again and it would take an hour for him to quit groaning and be warm again. As far as health, except for frost bitten feet, we were in pretty good shape. Our bowel movements and everything were regular. That C ration was very good for that and they used to drop us good supplies such as chicken and pork chops already fried. We even tried to make fudge one night in our lighter moments and we had a joke about not being able to find a place to get it hard. We would even make ice cream out of some malt. We mixed malt powder and chocolate powder and snow and beat it up and we would have ice cream.

Captain La Farge: I think that brings us up to the actual rescue.

Captain Monteverde: Several days before our rescue, they told us about the PBY and the fact that we knew Colonel Balchen was on the job way back when we lived in the fuselage raised our morale no end, so on March 17 the PBY landed by the motor sled camp and they landed three men and said those three men were coming down to us the next day the weather permitted and take us out by dog team. The surface was worst--strugi about 4 feet high. That is--imagine a smooth surface of snow, then a very strong wind will come along and cut shelves out of it

like diving boards. They were shelves of ice, hundreds of them. The only thing they could work in that were dog sleds and that would be with great difficulty and they would turn over and get stuck and it was overloaded anyhow with equipment for six men, so they did arrive the evening of the 18th. We had been sweating them out all day and I saw them as far as I can see. We could see them and not detect any movement for two hours at a time. When I could tell the movement by taking two skis and lining them up and see if the black spot had moved off those skies. Then, we could even hear them a couple of hours before they got to us. We could hear them for hours, the dogs barking, the dog driver calling his dogs, so they struck a camp just ahead of our ship in a little ravine and they came over the night of the 18th and we met Captain Strong, Sergeant Healy and Sergeant Doleman. Incidentally, Sgt. Healy is a very good man on Arctic work and so is Doleman. The last two sergeants were with Byrd on the Antarctic Expedition to Little America. From then on, they took us over. We quit everything and they practically tucked us in bed and played nursemaid to us and everything else--we were so tired of fighting for ourselves. They struck a camp and the next day they came over for us and we started out. The going was very, very rough and the dogs did a beautiful job. You should have seen those dogs strain and pull--it was a sight. They got us safely out of the crevassed area by sounding the way along. Spina was able to walk the first part and when we got out of the real bad area, Best and I were showing signs of weakness. We got about three miles out and it was too much for us. Spina had ridden and Best was falling down, and I had a feeling of wanting to lie down and not get up. This is a very dangerous feeling where you get very warm. They gave us reindeer parkas which were very warm and very nice and about three miles out, they pitched another tent and left Doleman, myself and Sgt. Best in the tent. While they were going on up to a place where they had another tent pitched, they came upon another hidden crevasse which they almost fell into, but Strong was able to hold onto the rope and we thought we were out of the crevassed area. Sgt. Healy came back for us along with the dog team. They struck a trail with chrome flags. We got back to the motor sled camp at dusk.

Captain La Farge: Was it still there?

Captain Monteverde: It was, but no one knew exactly where. Well, when they came up, there were 12 and they dug a

beautiful hotel which they later called the Imperial Hotel. They built it with rounded roofs so the ice when it melted, would run down the sides and form ice. We dug to get some exercise. We would dig this one tunnel where we could walk; one tunnel for the sleeping bags where it was comparatively warm in there. By that time, the weather was beginning to get good. We had several days in a row of good weather but one night the wind blew so hard we had to bring the dogs in with us. One poor dog stayed out and received a frozen member.

Captain La Farge: When you got to the Camp, the PBY wasn't there, was it?

Captain Monteverde: No, the PBY landed and let them off immediately and took off. The wind was very strong that day and it was very dangerous to take off. However, it was effected safely. The next main occurrence was on April 5th. The PBY came back and landed on a beautiful calm day, so we loaded-Col. Balchen was in the PBY, the pilot, Mr. Dunlop, the co-pilot, Mr. Water of the Navy. They are Mistfers but Lieutenants, and Engineer Saybo (or Sabo), and the radio man Larsen, a tall, lanky man, and we loaded the dogs, Captain Strong, Healey, Doleman, Sgt. Best, Private Spina and myself into the PBY. Of course, they had lightened it by way of a minimum amount of gas for this particular trip, all the guns out, all the equipment that was absolutely unnecessary for that flight was taken out so the ship would be as light as possible. We were unable to take off because there was no headwind, but the surface was ideal. The hull stayed above the surface very nicely. It would dig a foot and half deep in the light snow. Well, then we came back after two attempts to take off and let Captain Strong, Doleman, Healey and Col. Balchen off and the dogs and all the equipment for them to stay there, and we made a couple of take off runs again, and in the meantime, one of the engines had melted the cowlings and burned a fuel pressure gauge line off and we lost a lot of oil and we knew that engine wasn't going to last very long, and it couldn't be left up there very long because the wind would destroy it, so we had nothing left to do but to hope for a good day. The Navy personnel slept in the bunks of the PBY and we slept in the hotel below the surface. The next day, we got a nice, sun-shiny, calm day, no wind in the morning, but around noon the wind began to pick up, so we were loaded aboard. The same method was used in rocking it by the floats.

Captain La Farge: It is a new development, isn't it--super ski-plane?

Captain Monteverde: The Colonel would sit in the cockpit and signal for the men who were on the floats of the PBY, which were down, and they would rock it back and forth, while the man in the cockpit gave it full power, and then they would suddenly break loose and as soon as they would do that, the men would string out and the PBY would circle and Larsen would stand in the door, big, lanky man, and you would come up and get near that blister and he would pull you in as it went by taxiing.

Captain La Farge: He would reach down from the blister?

Captain Monteverde: They had a little ladder and we would step on the first rung and Larsen would pull us in.

Captain La Farge: About what speed were they going?

Captain Monteverde: You had to go against the blast of the propeller which wanted to blow you away. We were not going fast. You had to get on that step and Larsen would bring you in.

Captain La Farge: Did each of you get on that way?

Captain Monteverde: One at a time and naturally when one man was getting on, the next man would be approaching, and then the next man would get in the blister, etc.

Captain La Farge: Then you were able to head into the wind and take off?

Captain Monteverde: We made two runs and did not get off. In the meantime, the engine was using more oil and showing signs of getting too hot. We made one last try and the airplane just barely got up, and I mean in a very stalled condition. It got off okay and he gained altitude and feathered one engine and began to lose altitude and went down to fifteen feet above the ground, and he got the starboard engine--by that time, we were already reaching the declining part of the Coast, so we were heading to sea. In case we had to land, we would land in the ocean. I was sitting there and had the head set on and was listening to all the conversation between the pilot and the co-pilot and the engineer. I heard Mr. Dunlop ask Mr. Sabo how much gas they had. I think they had something like 120

gallons and they were using 73 an hour. We had an hour and five minutes to go. It was very close flying and he asked again how much gas they had and Sabo said that both gauges had hit bottom and did not show any flotation at all. We were then five minutes out. We didn't have enough gas to overshoot the field, so he very skillfully put it down close to the edge of the field and we landed with the nose wheel up and skidded along close to a B-17 parked at the end of the runway. The reason he didn't put the gear down any sooner was that in case he was forced to make an ice or water landing, he would have the gear up. That was Army Day April 6, 1943. That is my story. Do you think that will help much?

Captain La Farge: Perfectly dandy. Are there any comments you want to make about the first people you saw outside of your own group?

Captain Monteverde: We received a tremendous ovation at B-2. Every civilian and every Army man was out there to greet us. Naturally, it was a secret that the PBY had gone out, but they knew. They baked a big cake and everybody treated us just wonderfully. I would like to add in there about commendation to Corporal Howarth. I feel we owe our lives to him by his narrowing the search down when he fixed the radio. It was my good fortune in having such a swell crew and everyone worked together and it was a case of working together or none of us would ever get out alive and everybody obeyed every command to the letter and we got along wonderfully. Also, if you would like to know about the bombsight. Well, Sgt. Healy threw the bombsight down a crevasse witnessed by Captain Strong and myself. As far as I am concerned that is all. I told them, "This is as new to me as it is to you. According to Regulations, I am in charge but I want any and all suggestions you might happen to think of. We will work it out together." Spencer had a lot of good ideas, and when Tetley came up, his experience (two months more than ours) was very valuable.

LAKE O'CONNOR INCIDENT

* * * * *

While the crew of the B-26 was dying near Hebron,* and the two parties were barely clinging to life on the Greenland ice,** a third accident occurred which provided a laboratory, and a very thorough one, for the great northern spruce belt. This was the Lake (or Lac) O'Connor episode. In many ways the Lake O'Connor rescue operations were the most instructive of the lot. For one thing the terrain was not death dealing like the inland ice, but was sufficiently difficult to make a problem. For another, the plane involved was undamaged, and it was intended to fly it out. This took time and preparation, and there was no great hurry so that everybody involved had plenty of time to study conditions. The whole business was very pretty. The beginning, however, had the same pattern as the tragedies described above. On February 4, 1943 a C-87, AA Contract Carrier piloted by Captain O'Connor enroute from BW-8 to Presque Isle, Maine became lost over Canada. The pilot failed to contact Goose Bay, homed on the wrong beam, ran out of fuel, and was forced down on the ice of an unnamed lake in middle Quebec 53° 30' N., 73° 30' W., far west of the usual route.

On board the plane as a crew of five, headed by Captain O'Connor, the pilot, and fifteen passengers, eight military and seven civilians, the former consisting of seven Privates and a second lieutenant. The civilians were being sent back from BW-8 because of various illnesses. Again the emergency equipment on the plane was practically nil. There were only four sleeping bags; the food consisted of two small cans of chicken, two cans of tuna fish, six pounds of candy, eight boxes of Labs and some sugar;²³ there was a fire axe but only because O'Connor had lifted it from a hangar at Presque Isle;²⁴ finally they did have some sort of firearm because game was procured. The situation of this plane was, in short, similar to that of the tragic B-26, and it is reasonably certain that, if they had not been found, the personnel would have starved to death, for what game they managed to shoot was not

*See p 1 Ed. Note.

**Survivors of the PN9E. Ed. Note.

*23. Narrative of Captain O. J. O'Connor, March 9, 1943.

*24. Report on Lake O'Connor Experience by Lt. Col. Charles J. Hubbard to CG NAW, ATC.

sufficient for twenty men. Also the men, like those on the B-26 and the B-17 on the inland ice, had no experience in arctic living. One is not surprised to find, at this stage of the game, that a fleet of searching aircraft was sent out, none of which had proper emergency equipment.²⁵

The search procedure was not very well planned, but on the evening of the sixth of February Captain Clyde Watkins enroute from Crystal I to Goose Bay spotted them mainly by the purest good luck. He very nearly did not because the parachute flares they sent up were defective and were later found to have been made, quaintly enough, in Japan. Captain Watkins dropped bedding rolls and K rations, which were appreciated but not really adequate. So poor was the coordination for the search between Goose Bay and Presque Isle that, on February 9th, a meeting was held at the latter field to plan the search activities of nine planes concentrating around Lat. 52° N. Luckily a Captain McGuire came in from Goose Bay, and was able to inform the pundits that the lost C-87 had been found by Watkins between Lat. 54° and 55° N.²⁶

Four days passed before further succor came to the stranded personnel, during which time their inexperience became very apparent. K rations are not sufficient for men working in sub-zero weather, and the soup that the men made from ptarmigan and owl doubtless had more authority. There were still not enough sleeping bags. Captain O'Connor records that the general morale was low. Finally on February 10th what looked, to the marooned men, like an armada of planes, two C-87's and three C-47's, came floating around and dropped supplies. One of the C-47's landed in a cloud of snow. It was piloted by Captain Lord and contained Colonel Charles J. Hubbard, who was something of an acquisition since he had arctic experience. With the landing of Colonel Hubbard, the first, or primitive, stage of the operations was over.

Colonel Hubbard's account will now be scrutinized in some detail because it is an intelligent document, and undoubtedly its suggestions and recommendations bore weight in future planning. The Colonel landed in a shower of supplies, so to speak. It was well. He found the men suffering

from malnutrition, individual cases of frostbite, exposure and depletion due to the low temperatures,

25. Ibid.

26. Ibid.

inflamed eyes resulting from smoke of the open spruce fire, all in addition to the original ailments of the civilians which included gall stones and a tubercular lung.²⁷

Immediate attempts were made to clear snow for a runway to enable the C-47 to take off, but they soon discovered that special equipment would be needed and that the men were not up to it. The next discovery was that a decent permanent camp had to be set up as soon as possible if they were ever going to get anywhere with the snow removal. The original party had erected a half open shelter in the spruce woods, and lived there and in the plane. Colonel Hubbard and his party tried living in the C-47, and the Colonel promptly discovered that a plane was no place to live in at sub-zero temperatures. This C-47, like all the other rescue planes, had no emergency equipment. The Colonel went right to work and radioed Presque Isle for the necessary camping supplies. Although, oddly enough, they demurred, the necessities were dropped and two tents were pitched and a hut 12' x 12' was erected. After this development the physical condition and the morale of the men improved.

One would think that, in circumstances such as these, some one at the bases whence rescue equipment was coming would send the proper equipment. Colonel Hubbard's account shows that this did not occur. It might be well to quote the Colonel on this point

The support of the stranded personnel and aircraft was inefficient due to lack of experience at the supply point (Presque Isle) with such problems. It was necessary for the stranded crew at Lake O'Connor to request all small required items in detail, whereas it should have been a simple matter for Presque Isle to anticipate the needs of a bush camp. Items were dropped on Lake O'Connor by parachute at great expense. And yet much of the supplies so dropped were unsuitable. In the delivery of supplies for the first ten days, items particularly noteworthy were:

Inadequate footgear (shoepacks)

Inadequate handwear (light gloves)

Inadequate food stocks - Frozen beef and potatoes

27. Ibid.

were dropped instead of the balanced rations including dehydrates and concentrates known to have been available in Presque Isle.

Wooden shovels and spades unsuited to digging in compacted arctic snow.

Inadequate heating stoves were first delivered. This was later corrected by delivery of the drum type stoves.

No cooking utensils delivered. The camp was forced to cook for 25 men using two galvanized buckets.

The most curious example was the dropping by parachute of a bale of straw. This was undoubtedly well-meant, to provide warm flooring for the tents. However, it was indicative of the misconception of the situation. Great quantities of green spruce boughs were available resulting from the constant wood chopping, and spruce boughs made the best flooring, being both clean and nearly fireproof. The use of straw would have invited a very serious fire hazard in tents with glowing wood stoves and men smoking. It became the joke of the camp that a horse was expected by parachute to go with the straw".²⁸

In spite of the above ineptitude, which not only revealed itself in the matter of supplies, but also in almost every other department, Colonel Hubbard was so successful in establishing a camp that attention could now be turned to the problem of salvaging the planes. The first idea was to get the C-47 off. It was soon realized that clearing a large portion of the lake for this purpose was almost out of the question, but Captain Lord suggested that he might be able to get off on two ten foot wide wheel tracks. This was quite different from clearing a space 60' x 1500', and, since the personnel were so much improved, the work was accomplished. On February 26th Captain Lord, with only his crew aboard, made a precarious take-off and arrived safely at Presque Isle.

While all this was going on, various other things were happening. A couple of Barkley-Grow airplanes belonging to Canadian Pacific Airlines had been procured. These aircraft were equipped with skis and piloted by experienced "bush" pilots. Furthermore, as Colonel Hubbard later found, they were completely equipped for camping in the north country in

28. Ibid.

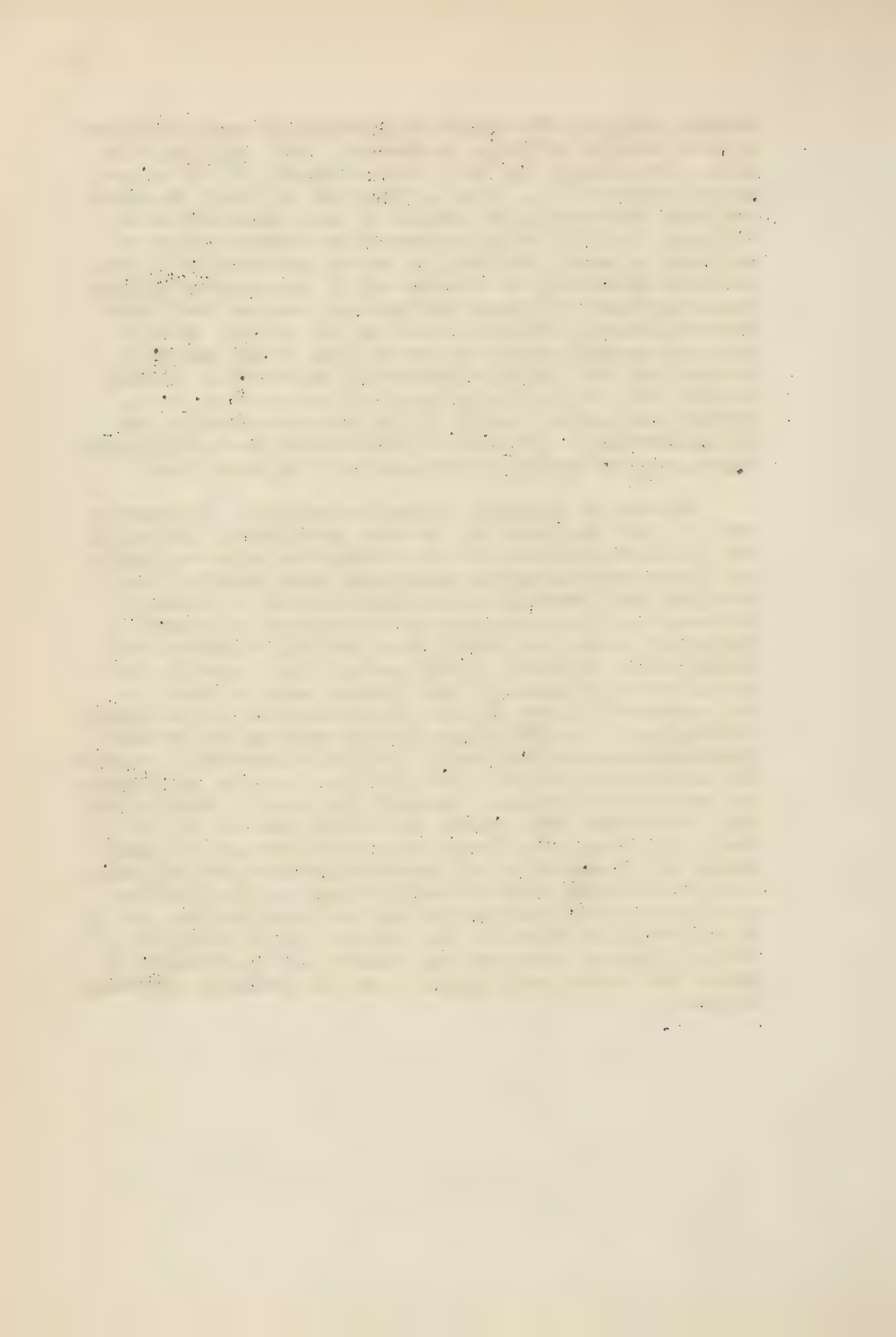
any weather, and not only camping but camping comfortably. Their method was casual; when weather became too bad for flying, they came down on one of the innumerable lakes, pitched camp, waited until it cleared, warmed up the engines and continued with the mission. This was in marked contrast to the management of our own rescue aircraft. When Colonel Hubbard was flown out by Barkley-Grow, they were forced down twice because of weather and shortage of gasoline in the same wilderness as the C-87, and each time they had a well-found and comfortable camp, this with equipment averaging forty pounds per man. The Barkley-Grow arrived on February 21st. It was delayed, again because of weather, until the twenty-fifth when it left with seven passengers, all the civilians except one and one enlisted man with bad feet. Two days after, February 27th, it came in again, bearing as passengers, Major Vaughan, Mr. Strom, and Captain Lemoine. Since Major Vaughan carried with him orders making him responsible for subsequent rescue and salvage activities, it was felt that Colonel could be relieved, and accordingly the latter took off in the Barkley-Grow, the same day, enroute for Rimouski. As mentioned above the plane had to land twice in the bush, once because of weather and once because of shortage of gasoline, but no inconvenience was experienced. With the departure of Colonel Hubbard, the operations entered on a third phase, which might be called the "great salvage operations", under the direction of Major Vaughan.

The problem now was to fly off the C-87. This entailed some confused thinking and a considerable amount of ingenuity, some of it misapplied. Experiment had shown that clearing a sufficient space on the lake by hand was not feasible; there would be piles of snow to be leveled, subsequent snow falls would undo the work, and it would take entirely too much time. Larger methods had to be considered. At first it was thought that flooding the surface by means of pumps through the ice would be an ingenious solution and not too hard a one. With this in mind Major Vaughan had brought the necessary pumps with him when he arrived in the Barkley-Grow. The plan was not a success. They pumped and pumped, but the water simply soaked into the snow to form slush, and for some reason the slush would not solidify even at -70° F. Worse, excrescences and accretions formed making a bumpy surface. It was borne upon Major Vaughan that the pumped up surface was not quite the method.

However, almost simultaneously with the above, another solution recommended itself. This was the landing on the lake of a small tractor to push a snow plow. There were two possible

methods, dropping the tractor by parachute in parts or flying it in on a cargo airplane, preferably a C-47, equipped with skis. Accordingly, the Heinz Pickle Company, of all people, made skis for a C-47. After a great deal of trial and error, including the cracking of one set of skis, which had to be replaced, the C-47 landed on March 29th accompanied by an AT-7 also on skis. The AT-7, it may be mentioned here, had been used previously to evacuate all of the original victims, including Captain O'Connor and his crew, and had been found very adaptable. With the arrival of the tractor, an ample space was cleared, mainly by the efforts of Sgt. Robert J. Johnson, who was the only operator of the tractor. Finally on March 8th, the C-87 with Captain Wynne as pilot, S. E. Pangborn as co-pilot, and M. H. Tetterton as engineer took off successfully. The AT-7 on skis removed the remaining personnel, and the whole operation was over by March 11th.

This was an extremely instructive episode. Fortunately once the C-87 was found and the camp established, the danger was no longer imminent, and the accident served as an excellent laboratory for arctic experiment, and, since no lives were lost and personnel did not suffer unduly, a cloud of witnesses was able to testify to the value of equipment. A variety of planes were tried, from the C-47 on skis to the Barkley-Grow, which had already proved itself with the Canadians. Of the planes, the AT-7 on skis seems to have the most successful though Colonel Hubbard advised, in his report, a variation of the PBY, which did not exist as far as exact specifications were concerned. The UC-64 (Norseman), so useful in Greenland and in later operations, was not used, probably because of distances. Although the episode ended in success, there were many errors, and tragedy was not far off in the early period. The search activities were poorly coordinated, and the supplying of the stranded crews was not good. A bit of bad luck, like that which struck at the Greenland operations, would have provided serious complications, and it is impossible to attribute the lack of it to anything except chance. However, this time the lessons were so evident, so gross, that no one could ignore them, and gradually something was done.



DELICIOUS MEAL AWAITS

Routine submarine patrol completed, the broad-winged Catalina lumbered baseward across Greenland's icecap, through a formless, numbing nothingness of snow and ice and haze and white fingers of sun feeling through clouds. Suddenly there was the awful crunch of hull against frozen snow and ice. The pilots grabbed for the throttles. The plane rose for an instant, settled, slid 300 feet up the slope of centuries-old ice, turned to rest on her left wing tip, stopped dead. An alert radio operator flashed an SOS.

For two weeks the crew of seven lived inside the PBY (with sleeping space for four), stranded on an uncharted peak 400 miles below the Arctic Circle, Lieut. Glister, navigator, told the story day by day:

"First day, Jan 27. . . . All attempts to move plane having failed, all men return to the plane and we make plans for the stay on the icecap. . . . Heaters not working. . . . Communications with the base are hot & heavy, with the put-put [gasoline engine to charge radio batteries] getting a good workout. . . .

"Second day. . . . Make a head [privy] in the tunnel hatch and place seat from waist hatch stool between rungs of ladder--not bad, although a bit on the chilly side. . . . Visibility picks up to three miles, still see nothing but snow and ice. . . .

"Third day. . . . Two B-25s. Talk about feeling good--nothing ever looked better. They dropped at least 25 bundles of food, clothing, drinks, radio, rations. . . . We're really lucky. . . .

"Fifth day. . . . The area about 20 yards in front of the plane is heavily crevassed--a few of us have fallen through up to our shoulders. . . .

"Sixth day. . . . We tried to start an oil smudge fire for the rescue party which was out trying to find a possible way to get over the glacier and up on the icecap to us. . . . The oil is like tar. . . . Rescue party has little success. . . .

"Seventh day. . . . Ski [Chief Petty Officer J. J. Rutkowski] gets very sick, heaves until he is weak, has chills, stomach-aches and we cannot keep him warm. . . . He has us

pretty worried. . . . The put-put goes out and the battery is very low. . . . Cannot key the transmitter, no plate voltage. . . .

"Eighth day. . . . The put-put is busy charging our batteries. . . . How all of us used to dislike the rattling of the put-put, now it is music. . . .

"Ninth day. . . . Beans and hamburger for supper. The hamburger had to be cut with two axes. . . . Word comes in tonight that five dog teams are to arrive at the foot of the glacier tomorrow. . . .

"Tenth day. . . .

Swing low sweet dog teams
Coming for to carry us home.

"Eleventh day. . . . [wind is] 40 to 45 knots. The plane is rocking as though we were at sea. . . . The rescue party must be having a rough time. . . .

"Thirteenth day. . . . The rescue party is coming in tomorrow. . . . Hear that Lieut. Dunlop has successfully landed on the icecap near Angmagssalik and taken the three remaining kids from the B-17 that went down the 8th of November—one of the kids had amputated both of his feet with a pocket knife to avoid gangrene—golly but we have been most fortunate so far. . . .

"Fourteenth day. . . . [I] climb up on the wing and see two men coming over the rise in single file. Then there appears a third, fourth, finally a fifth man. . . . The 15-mile trip up to the plane took these men about six hours and 20 minutes. . . . They said that the toughest part of the trip tomorrow would be at the end crossing over some six glaciers and then finally climbing a mountain—only 400 feet of it and then sliding on the seat of our pants down the other side into their camp. . . ."

"Sixteenth day. . . . At last we are off the cap with all its ice and away from the rocks of her mountains. A very warm and delicious meal awaits us. . . ."

1. The first part of the paper is devoted to a general discussion of the problem of the origin of life.

2. The second part is devoted to a detailed study of the various theories which have been advanced to explain the origin of life.

3. The third part is devoted to a study of the various experiments which have been conducted to test the various theories.

4. The fourth part is devoted to a study of the various theories which have been advanced to explain the origin of life.

5. The fifth part is devoted to a study of the various experiments which have been conducted to test the various theories.

6. The sixth part is devoted to a study of the various theories which have been advanced to explain the origin of life.

7. The seventh part is devoted to a study of the various experiments which have been conducted to test the various theories.

8. The eighth part is devoted to a study of the various theories which have been advanced to explain the origin of life.

9. The ninth part is devoted to a study of the various experiments which have been conducted to test the various theories.

10. The tenth part is devoted to a study of the various theories which have been advanced to explain the origin of life.

FOURTEEN DAYS OF HELL ON AN ICECAP

"If you want to know what it was like for the first seven days," said Pilot Officer David Goodlet, "take two of your best friends, climb inside a steel cyclinder and set the temperature at 40 below. For food, eat half a dog biscuit a day. For water, suck the ice your breath forms on the walls of the cylinder."

From his chair at the radiator, Flight Sergeant Arthur Weaver added: "And you shouldn't be able to know where you are or if you're going to get out. That was the worst part of it."

Two months before, while flying a bomber to England, Goodlet, Weaver and a third crew member -- Navigator Al Nash -- had been forced down on a glacier on the coast of Greenland. For 14 days, in temperatures as low as -40°, the three had kept themselves alive.

I was talking with Goodlet and Weaver in a Toronto hotel. Both were very thin and very young. Weaver was 21, Goodlet 22. Al Nash was spending his leave in Winnipeg, but he might as well have been sitting here with us. The three of them had gone through this thing together, and Weaver and Goodlet weren't forgetting it.

The room was well heated, but Weaver kept on his heavy service overcoat and continued to hug the radiator. "It's been two months since they took us off that icecap, but I still can't get warm," he said.

Two hours out of Newfoundland they had run into heavy fog. Then the radio went dead. Goodlet tried to get above the weather, but the bomber iced up and refused to climb. They flew blind at about 15,000 feet for the next six hours.

"With half an hour's gas left, I knew I had to start letting down," Goodlet said. "We passed through heavy clouds, wondering all the time if we were going to bump into a mountain. Al relieved things a little. He kept yelling into the intercom mike. 'Fifth floor: ladies' wear, lingerie, fancy hosiery.' Stuff like that. He was down to the bargain basement when we came out of the fog."

"I could see we were about 15 miles inside the coast line. There were mountains, jagged as broken beer bottles, running

parallel with the coast. We were flying over a snow-covered plateau sloping from these mountains to the sea.

"I went back and forth at about 500. It was hard picking a spot to try to land because the plateau was crisscrossed with crevasses. But I finally set her down on her belly -- leaving the wheels up, of course."

"He makes it sound bloody simple," Weaver said, taking up the story. "But landing in deep snow at 110 is something of a trick. There wasn't a jar. Al and I yelled, 'Good show!' and pounded the hell out of Dave when he came down from the pilot's compartment."

"Dave stepped outside to have a look and sank into the snow up to his crotch. We pulled him back and slammed the door. The sun was setting and we heard the wind blowing snow against the ship. I looked at the thermometer. It was 34 below zero."

"We decided to eat the sandwiches and drink the coffee they'd given us when we took off. But the coffee was frozen solid, and the sandwiches were hard as bricks. So we sat there sort of sucking at them until they melted enough to chew."

"Then we smoked, lighting one cigarette off the other. We had plenty of cigarettes--we were taking 5000 to friends in England--but we had only one pack of paper matches and Dave's lighter."

"Every ten minutes we'd pound each other and kick our feet against the floor and sides, but the cold seemed to be getting inside of us. Dave climbed into the cockpit and read the air-speed indicator. It showed 62 miles an hour and you could almost feel the wind right through the steel sides of the plane."

"I don't believe we'd have lasted through the first 24 hours if Al hadn't had the idea of ripping our parachutes into strips and winding them around our bodies and feet. By midnight the thermometer had gone down to 41 below and we were shaking with cold. We decided to crawl into the tail and lie on top of each other. Al stretched out and I got on top of him and Dave got on top of me and we pulled some more of the parachute silk over us. The heat of our bodies helped a little but we all kept on shivering. We stayed like that all night, taking turns at being middle man because that was the warmest spot."

"We talked all night -- about everything we could think of. We decided to ration the box of iron biscuits -- our only

food -- to one biscuit apiece every 24 hours. These biscuits were about half an inch square and were supposed to be full of vitamins, but they tasted like sawdust.

"Then we got talking about Gandhi and how long a man could go without food. Somehow that made us feel better, because we knew he was just a little old shriveled-up guy and if he could go for 50 or 60 days without food we thought we could, too. None of us said anything about Gandhi having the break in temperature.

"At eight next morning we pried open the door and looked out. The blizzard was still on, but the thermometer had gone up to 28 below.

"I think we were hungrier the second night than at any time later on. We remembered the Christmas dinners we'd had when we were kids, and talked about the stuff we'd left on our plates. That night we all raised our right hands and swore we'd never leave anything on a plate again.

"All the time we were talking, we kept on smoking and shuffling around. Our feet would get numb and we were afraid they'd freeze solid and gangrene would set in.

"That was the way it went for three days. About 11 the third night, the plane stopped shivering and we knew the wind had died down. The door was jammed with ice, but we cracked it open and jumped out. Al took his astro shots very slow and careful and found we were just within the Arctic Circle, about 15 miles from the Atlantic and 110 miles from the nearest place on our map.

"By that time our brains were a little numb, too. We weren't particularly scared. We started talking over how we could get to that place.

"We decided to inflate the rubber dinghy, drag it over the snow to open water, and paddle those 110 miles. But to get through the deep snow to the coast we'd need snowshoes. We found some plywood box tops in the cargo, worked all night with Dave's knife, and by morning had five pretty good snowshoes. We made the sixth out of the cushion in the pilot's cockpit. Then we collected the compass, the Very pistol, three marine distress signals and the box of biscuits.

"We'd just about got set when the wind rose and everything was gray again with whirling snow. It made us feel like hell and we didn't talk so much.

"Fooling with the radio that afternoon, I somehow got it working and picked up a Canadian airport--very low and weak. I broke in with the SOS and our position, and got an acknowledgment just as my batteries cut out.

"Both my hands were so frozen that toward the end I was hitting the key with my fist. But getting that message through helped us to keep going, and we spent two more days and nights talking, smoking and nibbling on the biscuits -- which we'd cut down to one quarter a day.

"There was no letup in the wind or the cold, and the inside of the plane became covered with ice about three inches thick. You got the feeling that the ice was closing in on you and there was nothing you could do to stop it except to stop breathing.

"Our mouths were sore and bleeding from sucking snow and ice, but no matter how much we sucked we couldn't quench our thirst. None of us had slept since we'd left Newfoundland, yet we didn't seem to be tired any longer or even hungry.

"On the sixth morning, the weather cleared and we inflated the dinghy with the carbon-dioxide cartridge. We destroyed the bombsight and burned all papers, using the flame to melt a cup of coffee, and started off. But the dinghy pulled hard and we couldn't go 50 yards without getting winded. In two hours we covered only a quarter of a mile; then the snow started again. We knew we couldn't last long in that stuff, so we worked back to the plane and holed in again.

"The next afternoon the weather took a funny turn. The temperature shot up 54 degrees and rain started. When we stepped out it was like stepping into the tropics. The snow was mushy and the going was even harder than the day before, but we kept on until dark.

"That night our flying suits and boots froze to us like armor. We propped the dinghy up with its aluminum oars and crouched on the lee side for the next 17 hours of darkness.

"As soon as it got light we started toward the coast. We had to walk off course for a mile to get around the first crevasse. And then we heard the sound of a plane. We made a dive for the marine signals. Only one worked, but that one was enough. The plane circled low above us and dropped small parachutes with food, clothing, sleeping bags, a bottle of Scotch, snowshoes, 100 feet of rope and a note of instructions.

"We put on dry clothes and opened the rations, which were divided into separate meals. We started with breakfast and worked our way through dinner. The note told us to rope ourselves together and keep on toward the coast in as straight a line as possible. A patrol boat would pick us up. After that we got into the sleeping bags and fell asleep -- for the first time in nine days. We woke up an hour later, sick as pups. That night, rain and sleet soaked and then froze our clothes and sleeping bags. It was damned cold lying in that slush, so we stood for the next 17 hours holding the sleeping bags over our heads to keep the rain off. We didn't dare take a step because of those crevasses.

"The next morning a heavy fog covered everything, so we had to stay put. We spent the day massaging our swollen feet. They were plenty sore, and it hurt like hell to walk with those snowshoes. We rubbed our feet with a little of the Scotch and that helped. The fog lifted about 2:30 the next afternoon and we began to plow across the snow. We were getting weak now so we discarded the sleeping bags.

"The temperature went way down that night and we huddled close together with our arms around each other. That was a mistake, because after an hour we were all frozen together in a solid mass and it took a lot of our strength to pry ourselves apart.

"I think that night, for the first time, we began to wonder if we were going to make it. The icecap was heaving, and every hour or so there'd be a thundering noise that echoed between the mountain ranges.

"Al said we should sing a hymn but none of us knew anything that was like a hymn except "God Save the King" and "Praise the Lord and Pass the Ammunition." So we sang those. It made our lips and mouths bleed like the devil but we felt better.

"The next day was clear and we made better time, although there were more crevasses as we neared the coast. We were moving and thinking like automatons now. Even when we came to the edge of a crevasse -- and some were a thousand feet deep -- we didn't feel any fear. We'd just methodically back away and walk around it.

"About 3:30 the next afternoon we spotted what looked like a rowboat out in the ice field. Our ship! We forgot our sore feet, our thirst, how tired we were and put everything we had into the last couple of miles between us and the coast.

"We reached the edge of the glacier just before dark and found we were on a sheer cliff of ice about 250 feet above the coast line. With Dave's lighter we tried to set our parkas on fire, but they were too damp.

"About seven, the ship shot off flares and played its powerful searchlights along the coast. The three of us jigged and yelled our heads off every time the searchlights swept across us. But the lights never settled on us.

"When daylight came we saw a plane take off near the ship. We yelled and waved our parkas. The pilot didn't spot us. Soon he turned back toward the boat.

"About dark the boat headed out to sea. We didn't say anything. We just stood there and watched it until darkness blotted it out.

"We thought we were gone then. We didn't have enough strength left to make it back to the plane and we knew we couldn't stand even one more of those 40-below nights in the open.

"About an hour after dark, Dave said he thought the parkas might be dry enough to burn now. We tore part of them into strips. Dave's lighter was getting low on fuel and it took a lot of sparking to get it going. But when it did the parkas caught and we had a good, bright blaze.

"As soon as the flames went up there was a burst of flares from the ship and its signal lamp started blinking. I read the Morse: 'Move back from edge of glacier and bear south to meet landing party.'

"The three of us yelled and pounded each other. We felt wonderful. There was a bright moon that night and we back-tracked over the crevassed area, then followed the glacier slope.

"A landing party picked us up six hours later and took us to the ship. It was a U. S. Coast Guard patrol vessel and the crew treated us like newborn babies. The skipper told us he had given us up for lost when he spotted our fire.

"I thought we'd been more or less normal all the time, but the ship's doctor told us later that we were in a sort of twilight between sanity and insanity and that we'd probably have cracked in another day and night.

"The thing that interested him most was the fact that we'd had only about two hours' sleep in those 14 days. He gave us stuff to make us sleep but even in the sick bay I couldn't sleep more than an hour at a time. I'd wake up to find Al and Dave awake, too, smoking and talking the same as they did back in the plane.

"It's been like that ever since. Neither Dave nor I could sleep more than an hour at a time. I don't know how it is with Al, but I'll bet he's waking up in the middle of the night, too, shivering with cold and scared to death he's back on that glacier."

I asked them what they thought it was that had kept them going. Neither Weaver nor Goodlet answered immediately. Then Weaver said:

"Dave had his wife and baby daughter. Al was worried about his mother, alone out in Winnipeg. And I had my wife. Do you see what I mean? We had something to live for."

ACCOUNT OF CPL PAUL A CURRY

September 3, 1944

My parachute caught in the tree tops. The jolt was not bad. I just let myself hang in the harness, swaying gently from side to side. I didn't move for several seconds. I didn't open my eyes or even breathe.

Gradually, the tension of the past few minutes subsided and relief washed over me in a comfortable warm wave. I was down - on land.

I opened my eyes, tentatively moved my head, arms, legs, hands and feet. I wasn't injured. I had missed the lake by ten feet, had come down through the trees and jolted to a stop about fifteen feet from the ground. I wasn't hurt. That was hard to believe.

I said, "God, am I lucky!" aloud, but in a whisper, like a prayer - and still let myself hang limp as a rag.

I realized then that I was still holding my breath, so, I let it go explosively and began to pant like a dog on a hot summer's day.

All this I remember precisely. Thereafter my thoughts and movements were vague and mechanical. I was hanging between two trees, about four feet from each other. I swung myself to the tree on my left and caught it. It was a hemlock, I think, or fir, about thirty feet high and eight inches in diameter, at the base. The limbs were small. Many of them were dead. All were untrustworthy, so, I religiously tried my weight on each before taking a chance. Even so, they would break, and my ankles were bruised and cut before I could unhook the risers and climb or slide to the ground.

I looked up at the overcast and listened hard for the motors of the plane. Silence. I shouted "Hello", and listened for an answer. But, just silence. Even the rain dripping onto the moss made no sound. I yelled two or three times more. But I felt foolish for doing it, so, I quit and looked out over the lake.

I thought, "Well, Curry, you're in a Hell of a spot. What're you going to do about it?"

I didn't do anything about it for awhile - just stood

there in the rain, looking at the opposite bank of the lake without seeing it, thinking of the crowded series of events that had preceded the landing in the trees. They were jumbled and as unreal as the fog into which the five of us had dived. I had to force myself to think of them coherently and in chronological order.

First - let's see - I was sitting placidly at the radio table of the B-17, gazing vacantly out the window into the impenetrable mists that surrounded us and boiled over the leading edge of the wings in feathery wisps. I was listening in on a voice frequency, and since nothing was coming over I had nothing to do. We were at 16,000 feet, on oxygen. I thought we were at 16,000, I mean.

"Shorty" Sanchez had been asleep on the floor of the radio room the last time I looked at him. Suddenly, I found him banging me on the shoulder with my parachute. I turned and looked at him dumbly. He shoved the 'chute into my hands and yelled, "Put it on! Put it on!"

I guess I thought he was kidding. The plane was riding smoothly even if we were in the overcast. I had had no premonition of danger.

I think I yelled back, "What for?" and laughed. But, he jammed the 'chute at me and leaped for the waist compartment.

At that moment a ton of bricks descended on my shoulders, pinning me in my seat. Shorty fell to his hands and knees as though he had been pressed down by an irresistible hand. He, too was glued to the spot.

It was a terrific effort, but I managed to turn my head so I could see into the waist. I saw Feebler and Costa and Linn lined up at the waist door. The pressure that was on me was holding them in a motionless crouch, one behind the other. The waist door was gone, and I suddenly realized that, with a freezing shock, they were about to jump!

The plane was in a spin or a very tight spiral. It was the centrifugal force of the spiral that was holding us pinned in our positions. We were utterly powerless against it. Fortunately, it only lasted for a few seconds, though each of those seconds contained an eternity of fear.

When the pressure relaxed, Shorty plunged through the door and disappeared into the waist. I made an ineffective job at tearing my oxygen mask off my face, and only succeeded

in jerking it awry, shutting off the vision of my left eye. I forgot it and frantically worked at snapping my 'chute to my harness.

That done, I, too, made a dive for the waist, only to be jerked back before I had fairly started, by the oxygen hose. It stopped me, but it served to jerk some sense back into my head. I snapped a look into the waist and saw Peebler, Costa, Linn and Shorty, also, lined up by the door. They hadn't started to jump yet. That meant there was a little time. I sat down again and quickly, but more calmly, set about freeing my oxygen hose from the parachute pack which I had snapped over it. It came loose, and I sat there for a few seconds, breathing hard.

The ship had been riding smoothly after its spiral. But, suddenly, it began to vibrate. The vibration started at the radio room, it seemed, and worked back to the tail, only by the time it got there it was no longer just vibration; it had generated into a definite shimmy. And then, suddenly, the pressure began to develop again.

This time I was out of my seat and diving through the door to the waist before the pressure had a chance to trap me. I landed in a crouch behind Shorty.

Peebler was the man at the door. He had a hand on each side. His legs were coiled beneath him. He was tense and ready, but calm. Costa was right behind him, his hands on Peebler's hips. I couldn't see his face, but his jaw muscles were bunched up in a knot.

Linn was behind Costa, on his hands and knees. He turned and yelled something to Shorty - something about his helmet. But Shorty shook his head.

The pressure decreased again, but the vibration began to build up until the tail section was rattling like tin cans on an iron roof. The horizontal stabilizer was snapping up and down viciously.

I asked if anyone was on interphone, but no one even bothered to shake his head. I looked for the headphone and microphone leads and found them and plugged them in.

Joe was calling Bill. He kept repeating "Pilot to navigator. Pilot to navigator. Pilot to navigator." Bill didn't answer.

Counsell's voice came through. All he said was "12,000 feet." Somebody said, "Roger." I think it was Johnson.

Joe was getting excited. He kept repeating "Pilot to navigator," his voice getting louder and louder. Then he said, "Radio from Pilot," and I answered.

He said, "Get ahold of the ground station. Tell them --", and he broke off.

"Do you want me to send an S.O.S.?", I said.

He came back, "Yes. Tell them the ship unmanageable." He broke off again and called the navigator. But Bill called me.

He said, "Paul, our position is 50° 55' North, 63° 40' West."

The plane lurched drunkenly, throwing me to the floor and jarring the figures out of my head. I fumbled for the push-to-talk switch. I was scared out of my wits, but the responsibility of remembering the coordinates of our position exactly scared me more.

"I didn't get that, Bill," I gasped. "Say again."

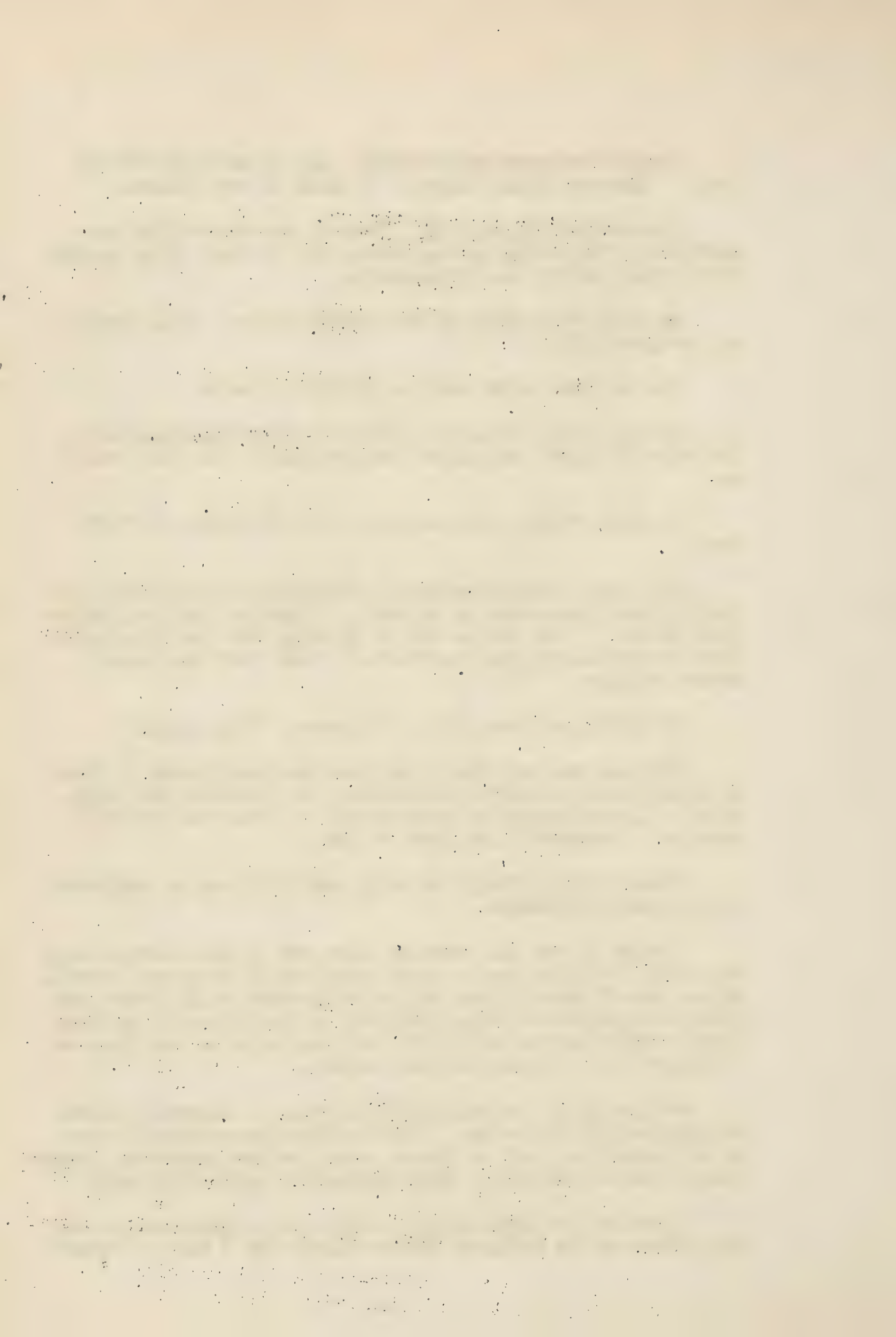
Bill was the only one of us that was really calm, I think. He spoke slowly, carefully, repeating the latitude and longitude. I forced myself to concentrate on those all-important numbers. I repeated them back to him.

"That's right, Paul," he said, and there was no excitement in his voice whatsoever.

I think it was his calmness that gave me the courage to go back into the radio room. Maybe not; but, it damn well helped. At any rate I made it back to the radio room on all fours, and struggled against the crazy pitching of the plane, to my feet. I saw that my papers and S.O.I. were scattered on the floor as I plugged in my throat mike and headset.

At this point the bail-out bell rang. I snapped a startled glance into the waist. I saw Peebler brace himself, toss an enigmatic look back at Costa, take a sudden breath and launch himself out of the door. Dave Costa moved swiftly forward.

I grabbed the push-to-talk switch and clamped down on it. One glance at the emission switch showed that I was on "Voice";



another glance at the place current meter showed that I was "On the air." I began to talk - fast - very fast!

"Pop control; Pop control, this is Army 272. This is Army 272. Mayday! Mayday! We are bailing out! We are bailing out! This is 272. Our position, fifty degrees, fifty-five minutes North; Sixty-three degrees, forty minutes West. Pop control that's five-zero-five-five North; six-three-four zero West. Mayday! Mayday! Mayday! Over."

Those were my exact words. I'll never forget them.

Pop control came back; "272 from Pop. We read your position at 50° 55' North, 63° 40' West. Is that correct? Over."

I remember thinking, "Damn it, I wish I could be as calm about it as that."

"Pop control from 272," I came back. I don't know how plainly I was talking. There was a suffocating constriction in my throat. "Mayday! Mayday! That is correct, fifty-five, fifty, sixty-three-forty. We are bailing out! We are bailing out! I jerked the headphone and mike leads loose and turned toward the waist door.

I had been bracing myself against the radio table in order to keep my feet. As I turned back to the waist, I remembered the I.F.F. set. But, I couldn't help seeing that the waist was empty. Everyone had jumped.

I whirled frantically back to snap the I.F.F. emergency switch on. I had just touched the switch when the plane shook me to the floor once more. I scrambled back up, jabbed at the switch half-heartedly, and found myself on the floor again. I thought, "To Hell with that," and crawled toward the escape hatch.

I had to crawl. The pressure was on again and the ship was trying to shake itself to pieces. I didn't know if anyone else was aboard now, and God! I felt lonesome. I think I was more lonesome than scared by then. Perhaps those emotions are too closely akin to draw a fine line between them. But, knowing that the others had gone out ahead of me made a very personal - and damn lonely - thing of it.

I got to the door and pulled my foot beneath me. I caught the sides of the doorway in my two hands, and took a preparatory breath, just as I had seen Feebler do. I pushed my head out into the slipstream to see the horizontal stabilizer.

From I will provide you further details and
I will also be able to help you with your
other questions.

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The wind tore my helmet off.

Then, I pulled with my hands, pushed with my feet, and so launched myself into the gray nothingness.

I caught a glimpse of the stabilizer as it flashed past my feet. That meant I was clear. I grabbed for the rip-cord handle. Then, I thought, "Maybe you aren't clear. Wait a few seconds." That was foolish, but I had heard of so many men who had had their 'chutes foul up with the tail that it seemed a very bright idea at the time.

I found myself mentally counting, and I was already at twenty by the time I realized it. I must have been counting awfully fast. Anyway, I decided that was long enough, so I jerked the rip-cord. Nothing happened!

I discovered in an instant that I had ahold of the handle for carrying the pack instead of the rip-cord. It didn't startle me. I felt perfectly at ease all of the sudden. There was no sensation of falling, such as you experience in an elevator. There was no sensation whatsoever, unless it was one of suspended motion.

I let go of the carry-strap, reached around the pack, slid my hand back along it until my fingers closed over the rip-cord handle. I jerked it. This time the 'chute leaped out of the pack.

The 'chute opened with a dull sort of 'whoomp', and I felt myself jerked erect. The jerk was not very severe. I just found myself swaying gently in a vast, gray void. The sound of the plane's engines droned away into silence.

I reached up and caught hold of the risers. The cloud through which I was descending was cold and filled with tiny ice crystals. They rattled softly against the taut nylon canopy. The canopy itself looked very small - about the size of an umbrella, and not a big one at that. But, it was mighty reassuring, billowing up there.

Suddenly, I remembered Joe asking Bill a question, and the thought of that question chilled me with a horror that is impossible to describe. Joe had asked Bill if we were over the ocean. I couldn't remember Bill's answer, but I knew I had no Mae West and that if the ocean was down there, I was doomed. Hanging there in that damn cloud, wondering if there was water or land beneath me, I was petrified.

But when I finally did break through the overcast, I found myself over a lake, drifting so that I would fall into the trees along the bank. Boy, did those trees look good!

The next moment I was in the trees. I just had time to cross my legs and fold my arms across my face when I hit.

And, so, now I was down, standing in the rain, feeling more relieved than a condemned man just handed a pardon - or just as relieved, at least.

I opened my jungle kit and got the folding machete-like knife out. With this I began chopping down the three trees over the tops of which the canopy of my 'chute had spread.

In the meantime, I had fired my pistol and received an answer from across the lake, quite a ways to my left. As I worked on the job of freeing the canopy, I would yell, "Hello!" drawing out the last syllable. In a few minutes I could hear an answering "Hello" from the same direction as the pistol shot. Whoever was answering was slowly getting closer. We kept hollering until we were quite close to one another.

I knew it was Shorty Sanchez sometime before he broke through the underbrush. But, when he appeared, he looked good enough to hug.

I asked him if he was hurt. He said he wasn't. I asked him if he was sure, positive that he wasn't hurt. He said, yes, he was sure, positive. So, we began to compare notes.

He had been the last of the four to go out. Peebler and Costa, he said, had grabbed a Mae West apiece and had jumped with them hooked in their arms. Peebler had gone first, but Dave was literally on his heels. Both their 'chutes had opened, and both had lost their Mae West's when their 'chutes opened. That was the last any of us saw of them.

Linn had gone next. He had got up from his hands and knees, moved to the door and jumped without hesitation. Shorty went out on Linn's heels. All the chutes had opened.

We got my 'chute from the tree. We were both wet and cold, so we selected the clearest spot around us and pitched a tent with the canopy. Then we tried to get a fire going.

Since Shorty had left his own parachute hanging in the trees - he had fallen out of the harness which hung out of his reach - the only dry matches we had were the paraffin

coated ones in my jungle kit. We collected the driest sticks we could find and tried to get them going, but in vain. We used four matches before we sat back to think the situation over.

We had a pocketbook edition of Damon Runyan's short stories, but the paper was too damp to burn. We looked through the jungle kit for something dry. We found the small bottle of mosquito repellent and decided to see if it was inflammable. It was, and so we sprinkled the twigs with it, used another match and got a few hopeful flames. We nursed those flames as carefully as any mother nursed her sick baby. Finally, we got a small fire going.

Soon after that we heard someone yelling. We yelled back. But we couldn't tell from which direction the voice was coming due to the echoes. It didn't come any closer and finally it stopped. Shorty kept yelling and whistling until he was dizzy; then he quit.

When it began to get dark, we curled around the fire and slept fitfully until dawn, waking every so often to replenish the fire and ease our cramped muscles.

September 4, 1944

We didn't get up until about 8:00 o'clock. There was no need to. It was still raining. Our clothes were damp, and we were chilled and shivering in spite of the fire. We got up and stamped our feet and flapped our arms to get the circulation going. We decided not to eat any of our "D" rations until night, since we only had one bar and didn't know when we might be able to add to that. We just gathered more wood for the fire and huddled around it with our thoughts.

We tried to figure out where we were, but we really had no idea. I remembered asking the navigator how far we were to Goose Bay and that his answer was, two hundred forty miles. But, that was quite awhile before we bailed out. The pilot had also told me that he thought we might turn back to Presque Isle. So, we didn't know whether we were in Newfoundland, Canada or Labrador. But, we figured we must be near the ocean since the pilot had asked about that. And we knew that we had lost the beam because I had heard Bill give Joe a five degree correction to the right in order to pick it up again. That was no help though, but we did know two things for sure: - that we were lost and that it was raining; and we weren't happy about either of those things.

About ten thirty I went to the top of the hill we were on and climbed a tree. Visibility was bad because the clouds were laying right on top of the mountains, but I could see that we were completely surrounded. I had had a faint hope that I might be able to see the ocean, but that hope was dashed. I yelled, "Hello," for about five minutes and climbed down. The underbrush was so thick that I had to keep shouting to Shorty in order to find my way back to our tent.

I had hardly got back when we heard a faint shout in the distance, Shorty whistled and I yelled. We kept it up and were rewarded by hearing the new voice gradually coming closer. At first, we thought it was Linn. I went down to the lake edge and saw him wading toward us. Shorty shook up the fire. That made three of us present and accounted for.

While Linn took off his clothes and we wrung them out and hung them up to dry, he told us his story. He, too, had been afraid that he was over the ocean, and the trees looked as good to him as they had to me. But, he landed on a hill top, so he had only just seen the trees before he was falling through them. His parachute did not catch in the tree tops as Shorty's and mine had done. He sailed down to land on a rotten stump which broke his fall. He wasn't injured either.

He got the 'shakes' after a minute or so and sat down on the stump that had received him and smoked a cigarette or two. He heard someone yelling for help, and he answered. The yells continued, but because of the many echoes he couldn't tell from which direction they were coming. He was afraid he'd lose his 'chute if he went off chasing echoes, so he stayed where he was. The yells faded out before long, anyway, so it would have done no good for him to have plunged blindly into the dense undergrowth.

He had jumped with only his summer flying suit, which consisted of a pair of glorified light weight coveralls. He was cold and wet, so he pitched his tent, rolled himself into as small a ball as possible and slept - or more accurately - tried to sleep. All in all, he spent a miserable night.

At daybreak he fashioned a pack out of his jungle kit and harness, took his compass and struck off to the East. He too thought we were near the coast. He stumbled through the underbrush for three hours, and when he sat down to rest he found himself within ten feet of his point of departure.

He could hear rapids in the distance, so he decided to

strike out for them and follow them down out of the hills. He had started out when he heard someone shouting "Hello." He probably heard me when I was up in the tree. At any rate, he changed his course toward the sound. And, so, we made contact.

We needed Shorty's jungle kit for the things in it, so, in the afternoon we left Linn at the fire, still trying to get warm after twenty-four hours in wet clothing and started out to retrieve Shorty's parachute and harness.

The underbrush was so tangled that we hadn't gone fifty yards before we were tired. So, we took to the shallow water along the lake shore and waded. Shorty said he had come down on an island and had forded a narrow neck of the lake to reach me. He said he had landed only twenty-five feet from the lake edge, so we shouldn't have any trouble finding the 'chute. We found the narrow neck and waded across, the water coming up to our hips.

The clouds opened up and the rain came down in buckets. We searched Shorty's island for an hour or two, stumbling, slipping, sliding, falling through and around and in the fallen logs, the moss, rocks and vine maple, but we couldn't find the parachute. So, we went back, considerably disgruntled and soaked to the marrow of our bones.

That night, the three of us huddled around the smoky fire. We ate two squares of the "D" rations apiece, smoked a cigarette apiece, and cursed the weather fluently and fervently, as well as the smoke which was constantly in our eyes. We definitely weren't happy.

September 5, 1944

After a breakfast of two squares of chocolate apiece and one cigarette which we passed around until it was no longer than a quarter of an inch, Linn and I decided to leave Shorty in charge of the fire and strike off for the rapids we could hear rumbling in the distance. We also wanted to look again for Shorty's parachute. There was an annoying drizzle coming down, and the clouds still hung in the tree-tops.

We forded the lake in the same place that "Short Stuff" and I had crossed the day before. The water was about six inches deeper, coming up to our waists. It seemed colder, too; we were chilled by the crossing.

We discovered that Shorty's island wasn't an island at all, but a peninsula that jutted out into the lake. We

searched for the parachute for two hours, but weren't able to find it. So we headed for the rapids.

The stream was about forty feet wide and it dropped swiftly out of sight toward the Southeast. That was what we wanted, since we figured the ocean lay to the East of us. We had two Wittnauer pocket compasses, and we compared them. They seemed enough, though we knew that there was considerable Westerly variation where we were. We figured ten degrees West. Later, we found that the variation was thirty degree Westerly.

We stumbled, cursed and waded our way back to camp amid a pouring rain. Short Stuff had a good fire going. We pulled off our soaked clothing and wrung them out.

We decided that if the weather hadn't cleared by morning we'd strike out for the falls and see whether the stream led us.

That afternoon Shorty spotted a squirrel, but he missed it. We had one square of chocolate apiece, went the rounds on another cigarette, and passed another night.

September 6, 1944

Dawn broke with a solid overcast, so we packed up our things. Linn made me a pack of my jungle kit like the one he had. We rolled the parachute into a pack, fashioned shoulder straps out of the remainder of my harness, and hung the thing on Shorty's shoulders. That pack gave us a good many laughs, at Shorty's expense, and was the reason for some of the most heartfelt profanity in the days to come.

I printed our names and rank and our immediate objective on some birch bark, folded it over to protect it from the weather, and tied it to a tree with some of the parachute shroud line. I also carved an arrow in the bark of the tree, pointing to the message. Then, with some of the parachute silk tied around our ankles we shoved off.

From that moment on, we lived in sort of a nightmare of hope and desperation. None of us was a woodsman. We didn't know where or how to put out our feet. When we fell, we fell heavily, and we stumbled and fell not just often, but continually. Limbs were constantly snapping in our faces, or whacking us across the hands or ankles.

We didn't mind it too much the first day because we had definite objectives - first, the rapids, then the stream to follow. But, when these petered out, the job of crawling, slipping, plunging, and picking ourselves up just to do it all over again, began to wear our nerves thin, and our patience completely out.

We cut over the peninsula and arrived at the falls. Then we turned to the Southeast, and keeping the stream to our left, we followed it down the ravine. More accurately, it went down; we went up; because a sheer rock face, about two hundred feet high, began at the bank.

About mid-day, Linn saw a small squirrel and shot it out of the trees with my gun. Shorty and I carried bird shot in our pistols. Linn carried ball ammunition for our protection. We had found bear tracks several times in our patch, and though we didn't fear the bear, we thought it best to have some protection. Besides, there was the remote possibility that we might run across a deer. The possibility was very remote because the noise we made crashing through the tangled underbrush would have scared a dead deer into running.

Later, I shot a bird. It was about the size of a small pigeon, had a black head and black wing tips, but the rest of it was a dirty white.

The stream we followed gradually changed from a wild, noisy torrent to a very mild and deep river about one hundred feet wide. By the time we had decided to camp for the night, we were convinced that we had another lake ahead to contend with.

We had no sooner got a fire going than another bird perched on a limb about twenty feet away. I added it to our larder. We sizzled the squirrel and birds over the fire and ate them with relish. But they were so inadequate that we also ate a square of chocolate apiece.

That night it was very cold, and we huddled so tightly together to preserve our body heat that when one of us wanted to change position to ease our cramped muscles and aching joints, he'd have to wake the other two.

Because Linn had no jacket, he slept between Shorty and me. He is taller than either of us, and so much taller than Shorty that it was practically impossible for Shorty to do much of a job of cuddling. Periodically through the night I'd wake up to hear him saying "God-dammit, Junior, get your feet

out of my groin! Cuddle, damn you. Don't roll yourself into a Goddam ball!" Junior would just grunt, straighten his body an infinitesimal degree and go right back to sleep, leaving Linn shivering and cussing.

September 7, 1944

We had two squares of chocolate and passed a cigarette around for breakfast.

The stream had become so slow moving and the going along the bank so difficult that we decided about noon to try our luck at building a raft. We thought to pile our stuff on the raft while we swam behind it, or walked, if we could find water shallow enough. So, Linn stripped and Shorty and I pushed some trees into the water for him to tie together with parachute shrouds. But the water was too cold. In half an hour his legs were purple, so we gave that up.

About 3:00 P.M. we reached the lake into which our stream poured itself. A half a dozen geese rested about twenty feet off the right bank. We crept up as close as possible and fired into them. The shot boiled the water all around them. Some were hit, but the stuff didn't have enough penetrating power. They paddled swiftly off, not even bothering to fly. I'd swear one of them flipped his tail disdainfully at us.

The weather was clear most of the day. We saw a B-17 flying toward us, very low. We ran to the lake edge and violently waved and shouted, but it turned away. It didn't come nearer than half a mile.

We also saw a C-47, but it was far to the East. And a Cub flew East of us, about a quarter of a mile away. We waved our head cloths at both of these, and I even fired my pistol at the Cub, but it sailed serenely over the hills and away.

At 4:08 P.M. we saw a Catalina low on the horizon. It was flying West. Seeing it gave us hope once more that we were near the ocean because we thought it might be a patrol boat guarding the coast. We made a note of the time, so that we could check on it the next day at the same time.

We kept the lake to our left and began circumnavigating it. We found a sandy strip of beach and could see that the sand extended far out under the surface. That gave us hope, too, that we were near the ocean.

Walking around one of these lakes is just one disappointment

after another. Aside from the mass of undergrowth, the slippery fallen logs, the rotten ones that look sound until you put your weight on them, the waist deep holes in the moss, and other such impediments - aside from these are the innumerable bays and inlets that take so much time to go around. The lake shore may look reasonably straight, and you'll think that now, at least, you can make some progress when suddenly you'll find a cut-back a quarter of a mile deep. There's nothing for it but to go around.

By nightfall we were completely bushed. We ate the last of our chocolate and went the rounds of another cigarette. Since there were only high cirrus clouds in the sky, we decided to wrap ourselves in the chute instead of making a tent. We were too tired even to build a fire. We just cut some pine bows, rolled ourselves in the nylon and went immediately to sleep.

And so, of course, it rained. And not lightly. We stood it until we were soaked, then we struggled out and made a shelter of the tent. Since it was pitch dark, we didn't get the sags out of the canopy, so that the water didn't all run off. Just a Hell of a lot of it came through. Our hip and leg joints ached anyway as though we had acute rheumatism. Being wet and cold accentuated the pain. We changed position every ten minutes, after gritting our teeth to stay put that long.

September 8, 1944

We were getting discouraged. We smoked a cigarette for breakfast. It rained until 11:00 o'clock, so we remained huddled under the tent, talking desultorily and somewhat pessimistically. We were about out of humor and snapped at one another.

When the rain quite slackened we packed up and went on. The going was the toughest of all. The underbrush was more dense, and we had several cliffs to climb over. After four hours we could see where we had started from, so we had a conference and started to strike off East across the mountains and to Hell with following the lake.

I shot a squirrel, and soon after Shorty got one, too. Our spirits improved, but we were still at or near dagger's points with one another.

When we got to the top of the first hill and looked around only to see more hills in every direction, we really began to view our situation with alarm.

If we had a map, we thought. If we knew how much the Westerly variation was. If only Joe had kept us informed of our position before we bailed out. If we just knew one damn thing for certain! Except that we were butting our heads against what looked like a very thick brick wall.

We no longer thought we were in Labrador. The weather was too warm for that we decided. And we tried to figure out what our latitude was by remembering that there had been quite an argument between the United States and Canada about the border line being 54-40. (Incidentally, upon our ultimate rescue this fact and those following in this regard, were thoroughly checked for authenticity by each of us and our error noted.) "54-40 or Fight!" We remembered the slogan, but we couldn't remember if there had been a fight, nor how it had come out if there had been one. We decided that 54-40 was the latitude of the U.S. Canadian border, and figuring 50-55 as the latitude our navigator had given us, we decided that we were two hundred sixty-five miles North of the border.

All right, that gave us an idea of our latitude, but what about our longitude? Our navigator had given it to us as 63-40. We tried to figure that from England. It came out 2,520 miles West of Greenwich but that didn't help. Still, we thought it more than likely that it placed us on the Canadian mainland instead of Newfoundland. So, we decided we must have been right all along.

We camped, built our fire, devoured our squirrels and felt much better disposed toward our predicament and one another. We would push on Eastward the next day.

September 9, 1944

We were awakened by the sound of a motor. We could tell the plane was low and that it was coming our way. We scrambled out of our tent and rushed to the lake shore. This lake had been waiting for us when we crossed the hill, and it looked just as big and imposing and cold and wet as the other two.

The plane came into sight. It was a high-wing, single-engined monoplane, and it was flying so low that there was no doubt of its being a search plane. It was going to come very close, so I waded out into the water and waved my head cloth at it. Shorty and Linn were jumping up and down on the bank, waving frantically. Shorty was whistling; Linn and I were screaming our heads off. It came right towards us. We thought, surely it can't fail to spot us, but, it banked sharply away and was soon lost to sight and hearing.

We smoked our last cigarette for breakfast. Linn said he remembered seeing a motion picture about some fellows lost on a desert who smoked their last cigarette right down to the nubbin, then burned the butt with proper ceremony. We thought we might do that, too, but didn't.

Instead, we talked about the advisability of staying where we were or of moving on. Shorty wanted to stay, Linn didn't. I couldn't make up my mind. We took a vote, and it came out in favor of going on just one more day.

We climbed. That adequately describes the entire morning. We climbed. We rested. We climbed some more.

Our strength was giving out. Ten steps upward and we breathed like a steam engine. We didn't have the strength in our legs or arms that we had the day before. So, we took it easy, stopping to eat some berries. Still, though we rested longer periods of time, we stumbled more easily and fell more heavily. I began to be seriously afraid that one of us would break a leg.

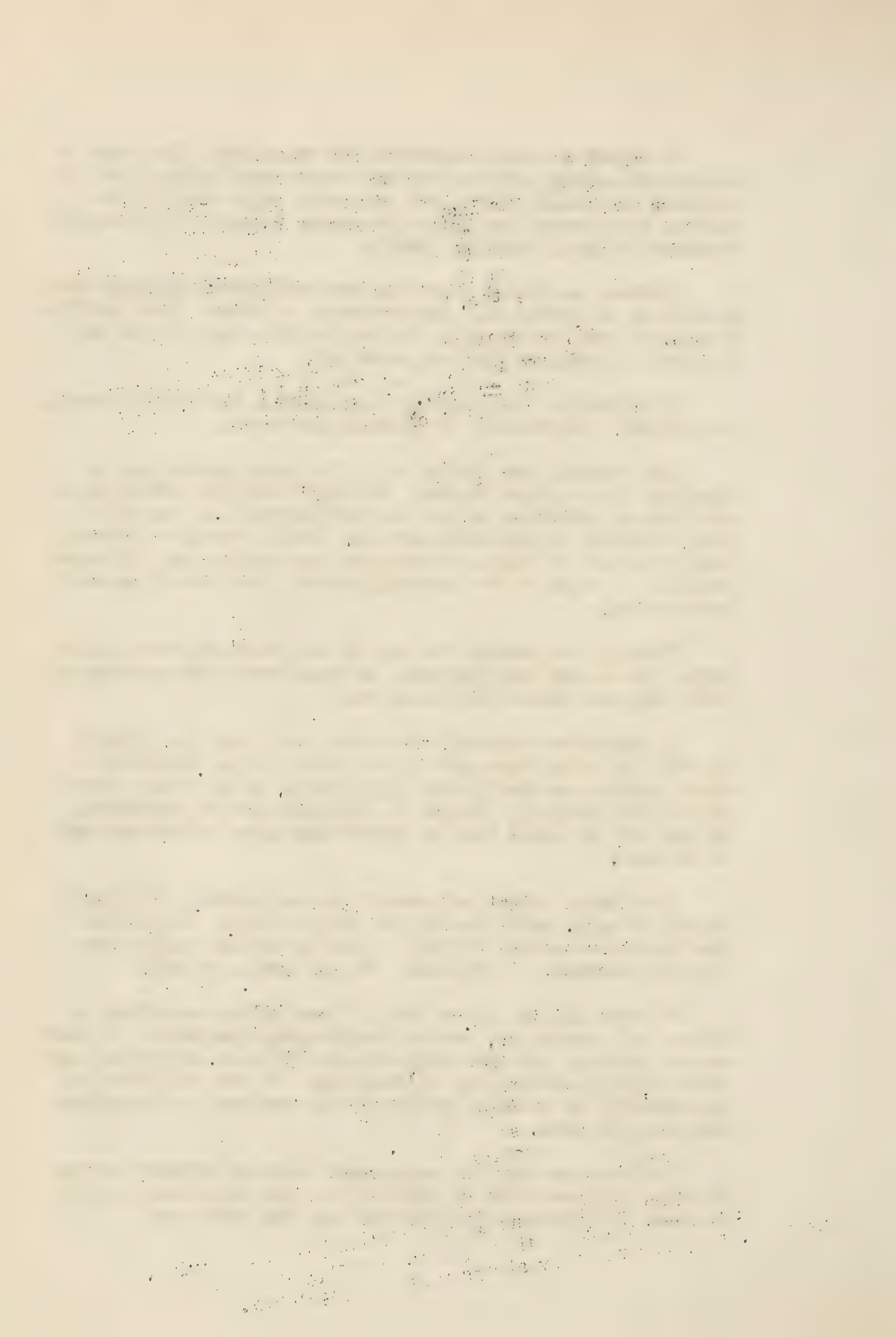
Finally, we reached the top of our third or fourth minor peak. We stopped and flopped. We could still see nothing but hills and more hills all around us.

A woodpecker ventured too close, so I shot it. Shorty cleaned it, while Linn and I got a fire going. We talked about whether we should stay right there, or move on. Shorty was all for staying. So was I. But Linn wasn't convinced. We were all so tired that we didn't much give a damn one way or another.

We pitched a tent and cooked the woodpecker. It didn't amount to much, small breast and smaller legs. We divided the breast in two and flipped a coin to see who would draw the hind section. I got that. We ate bones and all.

We were all in a blue funk. Those hills, one after another, all around us, were a discouraging spectacle. We were out of rations, and the squirrels and birds we had killed and eaten weren't keeping our strength up. We sat and looked at one another, or avoided looking at one another, our thoughts weighting us down.

We heard an airplane engine and listened without moving. We heard and saw a lot of them by now, and they were getting us down, too, because they always went the other way.



Suddenly, we realized that this one was going to come close. You can tell after awhile. We leaped to our feet and ran to look for it. Then, all three of us remembered that this time we had a fire, that we were on top of a mountain, and that if smoke could ever be seen, it would be now.

We dove for the tent and began dragging out the pine bows we had cut for a mattress. These we piled on the fire to make smoke. All this took only a moment.

Then, the plane came in sight. It was West of us, and flying so low that it was beneath us. But, it began to rise and turned so that it would pass directly in front of us. It was the same one we had seen in the morning.

Excitedly, I looked at the fire and saw that the smoke was just beginning to billow upwards in a nice column.

The three of us began to leap up and down, wave our arms wildly, and scream like fools. I remember that Shorty was repeating, "Come on, Baby! Come on Baby!"

The plane banked gently away, and our hopes tumbled like a deck of cards. Then, suddenly, it flopped over onto its wing tip and flew directly toward us. It seemed over our heads, so close that we could have touched it.

For a moment we just stood still. Our strength had completely deserted us. Then both Linn and I made a dive for Shorty, whose idea it had really been to stop where we were and build a fire. We hugged him until he hollered for mercy.

We could hardly believe that we had actually been seen. Yet, there was the high-wing monoplane pointing its nose at us again.

It dropped messages and packages to us. We kept the smoke going by cutting branches and piling them on the fire. We chased the messages. We found the packages and lugged them back. We found some cans of permican in the bundles and chewed on it. We forgot our fatigue.

The first message was dropped in a beer can with a long red streamer. It read "Stay put. Keep fire lit." We were more than willing to do that. We indicated by arm signals that we had received the message and would comply.

The plane began to climb in circles above us. We figured they were trying to pin-point our position on their map, so we

kept the smoke billowing. Eventually they flew away.

They had been gone only a few minutes when another plane appeared. A P.B.Y., Catalina, flying boat. They, too, flew over us and dropped messages and packages, but we weren't able to find any of them. They headed for the lake we had left in the morning and began to drag it as if they were going to land. We watched their efforts pretty sceptically because the high hills seemed to preclude any chance of their landing. After four attempts they gave it up.

Now that the excitement of the moment had passed, we all felt completely exhausted. Linn and Shorty sat down and couldn't move. I kept up the job of cutting pine bows in preparation for the monoplane's return.

It came back after a few minutes, and it had another monoplane with pontoons with it. They both zoomed us several times, then the plane on floats lost altitude toward the lake. The other one dropped us another message which lit away off in the trees. Shorty went to find it while I made negative signals to the plane. Finally, Shorty yelled that he had found the message, and brought it back.

The message said: "Rescue ship on lake. Look for flare." I gave the affirmative signal, and the plane flew over to the lake and began circling. We didn't see any flares, but we knew that it was circling the position of the rescue plane.

Linn's shoes hurt his feet so much that he took advantage of a pair of boots that he found in one of the bundles. We had to wait for him to lace them up. Then he put on a white parka which he also found in the bundles. We started down.

Instead of going straight in the direction of the circling plane, we followed a creek down the mountain. The going was easier. When we got to the lake shore we paused to rest and fire our pistols. The answering shots seemed to come from every direction at once, so we waited for the monoplane to guide us in the proper direction.

Linn and Shorty were more tired than I, so I struck off ahead of them. When I found the plane tied up nose first against the bank, I shouted back at them until they arrived.

The pilot, Lieutenant Martin and the engineer, S/Sgt Boyce, were on their way into the hills to find us, which was why their answering shots had confused us, but they returned in a few minutes.

After saying the things natural to be said under the circumstances, and after luxuriating in a cigarette of Lt. Martin's, we climbed aboard the plane. It was a Canadian-built Norseman, powered by a six hundred horse power engine.

Lt. Martin was afraid that we might have trouble getting off the lake because of its glassy surface. We taxied as far in one direction as possible, turned around and began to 'sweat out' the take-off. Lt. Martin did a magnificent job of it, so we were soon on our way "home".

The Norseman which had found us joined us on the way in. The two planes buzzed the field twice, then separated. We went to a nearby lake, circled it once, and landed.

A canoe met us at the buoy, and we climbed gingerly into it, and were paddled to shore.

It seemed that the entire strength of the field was present to greet us. Lt. Colonel Kern, Commanding Officer of the field, shook hands with each of us as we stepped from the canoe. Everywhere there were smiling faces. Everyone seemed genuinely glad to see us; we were certainly genuinely glad to see everyone.

We were piled into a Buick station wagon and driven at break-neck speed to the hospital by Captain Pander. At the hospital we met Captain Snyder, who got us to bed and had some tomato soup served to us. That soup was undoubtedly the tastiest food we had ever eaten.

Later, we met Lt. Freesland, who had piloted the Norseman which found us, and Sgt. Woodruff, whose sharp eyes had first spotted us.

We learned that the Government had used fourteen planes with their crews, had burned twenty-two thousand gallons of gasoline to find us.

And it wasn't stopping with us. Dave Costa and Leland Peebler were still missing. The search went on. And, now a week later, it is still going on. The Norseman, on floats, cracked up on the lake, slightly injuring three men, Lt. Freesland among them. They brought another plane in.

Captain Knudsen, one of the finest of Northwoodsmen, is on foot in the hills with eight men. Jim Laughy, experienced Northwoods guide, was one of the men who was injured in the crack-up of the Norseman, but he wants to go back, and is going back.

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TO THE EDITOR OF THE JOURNAL OF THE AMERICAN CHEMICAL SOCIETY
FROM DR. J. H. HARRIS
RE: [illegible]

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If Peebler and Costa can be found, the Search and Rescue boys will find them. They've risked their lives everyday. They don't intend to stop. Our hats are really off to them, and to the men who are working with them.

THE MIRACLE OF UMANARSUK

The weather report said we'd have nothing but the best, all the way to Greenland--all the ceiling in the world, no storms, no icing, nothing but the usual headwinds. W'd been waiting in Iceland three days for that report. You don't fool with nature over the North Atlantic in the fall and winter--or any other time, if you're wise--and you especially check and double-check when the ship you're flying is an aged Hampden bomber and your course is over the hop-skip-jump route--Iceland, Greenland and Labrador--from Britain back to Canada. They haven't much range, those old Hampdens.

This was just one of a flock of routine transocean flights we'd done together--RCAF Pilot Officer Ted Greenaway, our navigator; Pon Snow, who'd been with the merchant convoys before joining the Royal Air Force Transport Command as a radio operator, and myself. A native of Baton Rouge, Louisiana, I had left a first officer's job with TWA a year before Pearl Harbor to ferry bombers across the Atlantic for the beleaguered British. Our crew was a real team. We had been together to Algiers, to Egypt, Palestine, Iraq, Iran, India and all over the United Nations' map, at one time or another. This time we had delivered a four-engined job to Scotland, nonstop from Canada, and were bringing back this old Hampden for training-field use.

On the strength of the report, we pulled out pronto over the big stretch of Atlantic called Denmark Strait, and for upwards of three hours the old lady ran like clockwork at 11,000 feet. We could actually see the Greenland peaks, 130 miles ahead, although our landing strip was much farther on, when the port engine conked. And I mean "conked." No sputtering. No choking up. Just sudden death in the middle of a purr. Some vital part of that engine--I'll never know what part--had broken clean off, leaving us far out to sea in a crate which can't maintain altitude on half its power plant. But with luck, we might be able to sneak it out, we figured at first.

To lighten ship, Greenaway jettisoned our personal effects and everything loose he could lay his hands on, while Snow was SOS-ing our position on the emergency battery, our main transmitting gear having passed out along with the port engine. Meanwhile I was coaxing every inch I could get out of the starboard engine. As we lost height, I kept reducing speed, doing my utmost to fly level and cutting it fine as silk.

But down she went to 8000 feet, to 6000, to 5000--down, down, down.

We were around 4000 when Greenaway's voice began coming over the intercom. I took my eyes off the instrument panel just long enough to pick up the mike. That momentary eye shift was fatal. In that single second, the Hampden, flying close to stalling point in our battle to hold height, went over into a left-hand spin with the bit in her teeth. There wasn't much I could do but wait, and, by the time she wallowed out of it, less than 1000 feet of air separated us from the ocean. Nobody had to ask anybody the score then. We were in a bad jam, and all three of us knew it.

The next job was to get down onto the heavy, rolling swells which might break the ship in halves on impact; onto a sea full of bergs, floes and drift ice. It was like driving a camel through a needle's eye to find a clear space big enough to land in. We had no time to waste picking spots. It was get down where you could, and get out of the ship in a hurry. Fortunately, on hitting the water, the Hampden stayed in one piece long enough to release the self-inflating dinghy and let us out to escape hatches--a matter of seconds, no more. We made it.

Now we had to make our way to shore, twenty miles or more away, in a rubber boat through whatever channels we could find in the ice, and in the approaching sub-Arctic gloom. That doesn't sound like much, as tough spots go nowadays. But a rubber dinghy is just like a tire, and the jagged fingers of drifting ice floes are like nails on a highway. The closer inshore we worked, the tighter the ice jam became. Throughout the long northern night we made no attempt to paddle our frail raft; we just fended ice away until our hands were beyond feeling, expecting to have the raft deflated any minute.

None of us will ever forget that night, almost twenty hours long. The moon came up and the stars were out. All around us, bergs towered like fairy castles, growlers rolled and bumped one another in maniacal collisions, while floes and drifting hunks of ice as big as a ship's boat bore down on us from every quarter. Every now and then, a crack like naval gunfire boomed out of the northwest, until we firmly believed a convoy must be near us and under attack. Colliding bergs echoed thunder across the night and telescoping floes shrieked like giant maladjusted brake drums. The swell of the sea imparted a rolling, drunken motion to the scene. In the midst of this delirious dance of the bergs we fought ice and sea in a rubber boat which moved in a series of flat

spins--three weary men peering, wide-eyed, into a nightmare world.

With the next short span of daylight, we were able to work in closer to the coast. Off to the north, a massive glacier poured its detritus into the sea. It was then that we decided the gun cracks of great chunks breaking free and the roar as each fell into the ocean were the sounds of battle we had heard the night before.

Immediately ahead, a bold escarpment rose majestically from the water to a height we reckoned at 2500 feet. It was bald as a billiard ball, but it looked like heaven. With renewed strength we pushed into the ice-free shore current and toward the rock. Not a sign of beach or cove met our searching eyes. Nothing but naked rock reaching up and up. As we came alongside, Snow went over with the line and grabbed for a hand or foot hold. Greenaway and I followed and we attacked the cliff, towing the dinghy and making for a ledge about 100 feet above our heads. When we reached it, the level space was barely big enough to hold the dinghy, so we left it behind and clambered higher, looking for a better home. Fifty feet farther on, we found a broader ledge which would accommodate us, though Arctic storms soon would drive us higher still to escape the flying scud from crashing waves. On that stark cliffside we began to fight death from starvation and exposure, without fire or shelter and almost without food.

At first, however, our spirits were high. We could peel off our sea-soaked flying clothes and dry them. We believed we could lie down and rest. Then we could bring the dinghy up the face of the cliff and erect some sort of shelter. We could investigate our emergency supplies and set up light housekeeping. Then we would explore the neighborhood--tomorrow, perhaps--for berries and birds' eggs and fuel. Meanwhile the RAF would have picked up our position from Ron's SOS. Probably help was on the way already. As soon as we heard planes, we'd send up flares from the supply in the dinghy. The rescuers would spot us, drop food, fly home and send a ship to fetch us.

So we talked and dreamed as we stretched out on the ledge to rest our weary bones. It was our hour of exhilaration, the last for many a day. We thought we were three very lucky guys. Well, we were, but not in the way we believed when we landed on Umanarsuk, which, in Eskimo, means The Rock That is Shaped Like a Great Heart.

We inventoried the dinghy. In it were a Very pistol and

two dozen flares, a small mirror for helioing sun-reflection signals, a flag with a telescoping metal stick attached, 135 malted-milk tablets, a dozen small squares of barley sugar, chewing gum, a dozen pints of water, a pack of energy pills and a first-aid kit. In addition, we had odds and ends of chocolate in our pockets.

We had warm clothing on us, but we soon found that before it had a chance to dry it was always soaking wet again from spray. Ron had no headgear, so he tore the fur collar off his flying suit and made himself a cap. We established a ration schedule--three bits of chocolate and three malted-milk tablets or pieces of barley sugar per man per day. We organized ourselves into watches and sat down to wait for the rescue party.

But the down-to-earth realities of our predicament were soon brought home to us. Scarcely had we put our possessions in order when we heard aircraft overhead. Their presence bore out everything we had told one another. We were as good as rescued already! As the planes, a Fortress and a Liberator, passed above, I sent up flares while Ron waved the flag. For all the attention we attracted, we might as well have been lighting matches and waving a handkerchief. The planes simply kept on plugging east, Britain-bound, and vanished. As we looked at one another, disconsolate, we dared not put into words the thoughts in our minds. Then the dams of anxiety burst. Hadn't they heard our SOS? Weren't they even out looking for us? Bitterly, we swore at them all. We were in a tight spot, and we knew it now, and the anger of utter frustration welled up in us.

A Battle with Nature

Soon we were adjusting ourselves to the long siege ahead, however. Exploration of the near-by area brought no comfort. The east side of Greenland is no place for a human being, unless he is in a stout and well-provisioned ship. Frigid, ice-bearing currents sweep down from the Pole to Cape Farewell, and the climate is Arctic twelve months in the year. The bleak Danish settlements of the Greenland west coast are Floridian by comparison. We hunted for a cave or even just a sheltered crevice in the rock, but found neither. The only growth we were ever to find was a puny, bitterly inedible lichen. There were no birds' nests, and no flotsam that might be used as fuel. All nature provided at any time was snow to slake our thirst.

The first night we deflated the dinghy and used it to

cover us. Our flying suits were our mattresses and we huddled close together to share our body heat. By midnight, a gale had risen and was blowing sleet and scud into our eyrie. We tried, without much luck, to tuck the dinghy over our heads and under our feet and to lock the sides under the bodies of the two outside men. The storm raged throughout the next day and night. It left us spent, with our clothing and covering waterlogged, and ourselves half frozen. Already frostbite was gnawing at Ted Greenaway's feet. Ron and I would soon be its victims too. When men fight nature on the Greenland coast, and they fight without equipment, they're licked before they begin, unless destiny takes a hand in the game. During the second night of the storm, destiny wasn't worth a nickel on Umanarsuk.

On the third day, the sun broke through in glory, shining on glistening ice and gray rock, and we were new men again, even Ted, whose feet were grotesquely swollen, but who could still muster a grin. Ron and I announced our intention of scaling the summit, to find a crevice in which to plant our flag and to survey the country. Maybe we could find berries, fuel or the makings of shelter. Ted argued his right to come, but we insisted he must remain behind, if only to fire flares, should an airplane appear. Then Ron and I swallowed benzedrine tablets and, when they began to take hold, we assaulted the face of the cliff. The tablets had a real pick-up. A few days later they wouldn't give us the slightest lift, as by that time we had been drained of our physical reserves.

On top of Umanarsuk we ran up our distress signal, though what good we thought it would do in that Godforsaken corner of Christendom I have no idea. At least it gave us a feeling that we were doing something. Not a sign did we see of anything edible, however, or of fuel; nothing but bald rock. Ron and I took a geography lesson up on Umanarsuk that day, and it was not the kind of lesson to cheer a shipwrecked mariner. First, we learned that we had not reached the mainland, but only a big hunk of rock some distance off the coast. Between us and Greenland proper lay a broad gut of water and, beyond the gut, precipitous cliffs and the glacier, a country even more forbidding than our barren island.

To attempt the voyage down the coast in the dinghy, thence around Cape Farewell, at least 200 miles south, and around the corner in search of human habitation, was out of the question. We'd taken one terrible voyage in that dinghy already. There was nothing lighthearted about the two people who clambered back down the cliff to Greenaway. We were in a desperate fix.

We weren't even kidding ourselves or each other any longer.

The fourth day held fair, but about noon of the fifth day another storm began to blow up. By nightfall, it had reached gale force. Great waves, crashing against the foot of the cliff, flung sheets of water over our ledge and 150 feet higher. Unwilling as we were to try to climb in the storm and darkness, our discomfort finally drove us to it. As we stood erect and lifted the dinghy, the wind almost carried it, and us with it, over the rim and down into the sea. Fumbling for every hold, barely able to cling to the waterlogged fabric we were dragging, although crippled by frostbite, somehow we reached a higher ledge, where we collapsed, locking ourselves under our covering and pressing close to one another in search of warmth.

All through the sixth day we scarcely moved. One thought was burning in each man's mind--when a service airplane goes missing over the North Atlantic without trace or clue, the normal period of search is five days. You can't expect them to look forever for the needle in the haystack. We had run out our string of expectancy, and a day extra. Now we knew our SOS had never reached home.

Since we got out of Umanarsuk, people have asked me if we prayed. It all depends on what is meant by prayer. If prayer is something deep down inside a man's heart and spirit which keeps him going when there is nothing to hang on to, we prayed. There is one prayer we said together, two Protestants and I, a Catholic. Its name is the Lord's Prayer, and it has dignity and strength. In those black days on Umanarsuk we repeated it together, slowly, time and again. Its dignity gave new dignity and strength to us.

Otherwise, we didn't talk much. At first we used to tell one another about the huge steaks we were going to eat and the scalding coffee we would drink out of buckets as soon as we got "outside." A little later we used to talk about our wives and kids and families, wondering if they knew we hadn't made port and if they would be worrying. But pretty soon we abandoned that line of conversation. Sometimes you can't talk too much about things that matter, and stay in one piece emotionally.

Sleet again, then snow, came behind the gale. Our garments froze like boards on our bodies. The deflated dinghy was stiff as a wooden platform. We lay on the ledge, worn and wretched, as the snow blew in around us. At first we scooped it in our hands and carried it to our mouths. But

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after our thirst was satisfied, we lacked either the strength or the ambition to clear the drifts away from our resting place.

The weather abated slightly during the seventh day. At times we heard the engines of aircraft that weren't there. When we peered out to sea, we could swear we saw ships. We were growing progressively weaker. Greenaway's feet were now frozen, and Snow's and mine were not much better off. But at least our faculties were in working order. The big fight now was against an overwhelming lethargy.

The sun shone strongly on the eighth day, and we knew we ought to clear the remaining snow away before it melted into pools. But we didn't have the energy. Mostly we just leaned back against the wall behind us, looking at the ice-filled sea and waiting. Suddenly, at one point, Greenaway cried "Ship!" and our strength seemed to return momentarily. In an instant we were all out at the rim of the ledge, staring out to sea and agreeing that this time what we saw was no optical illusion. This time we vowed we could see masts and deck housing, and the ship seemed to be moving slowly north, against the coastal current; so it couldn't be just a berg that resembled a ship, we felt sure. No use trying to flash with the mirror; the sun had gone back in. But we fired precious starshells. Nothing happened. The ship disappeared. Just another mirage, I guess.

On the ninth day, we reduced our rations to one malted-milk tablet apiece, three times a day. That would keep us going another week, provided they were sufficient in themselves to sustain life. Disaster had struck our larder earlier when water melted our small supply of barley sugar. We had swallowed the resulting liquor and practically eaten the fabric in which the sugar had dissolved. Weakness was the greatest problem. For hour after hour we simply lay under the dinghy fabric, neither awake nor asleep, but just in a sort of torpor.

The sun shone weakly on the tenth morning and we crept out toward the edge of the ledge to drink in whatever warmth our bodies could absorb. As we lay there, a four-engined bomber raced across the sky in full view and disappeared. The flares we fired were no more than pin points against the sun.

We were alone in the universe again. I do not know what thoughts the other felt, but I know about my own; I touched bottom in the pit of despair.

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And yet somehow man always hangs on as long as he can. We talked for a while in cracked and croaking voices, trying to keep one another's spirits up, each attempting to conceal his own want of hope. But it was no dice. We simply weren't up to conversation any longer. The sun was dipping down the sky before any of us moved. Ron was out looking for snow to quench his thirst. Then he uttered that single syllable, "Ship!" that Greenaway had cried out before, and unbelieving, but always hoping, always grasping for the last straw, Ted and I wriggled out toward him to look.

None of us remembers much about what happened after that. We fired precious flares from our depleted stock. We flashed with the mirror. We thought we saw a boat put out and the lift of its oars across the water. Then we vowed it was another mirage. But no; sure enough, it was really a boat!

The Thousandth Chance

The rest of this story comes from Maj. John T. Crowell, who was aboard the little Norwegian whaler, Polar Bjorn, chartered to carry a party of American officers up the east coast of Greenland on a special mission. The passengers were playing poker in Bjorn's two-by-four saloon to while away the time, when suddenly the whaler's Diesel stopped thumping and Crowell left the poker game to go topside and ask how come.

The chief engineer described the engine trouble and said it would take hours to get going again. Because Major Crowell didn't like the idea of drifting all night among the bergs, he swept the sea and coast with his binoculars to size things up and decided that if a wind came up, they might take a bad thumping or worse. He figured he might just as well go back to the poker game and forget it. There was nothing he could do that would move the bergs away. He was on the point of stowing the binoculars and going below, when he picked up a brief flash of light, the sun catching our mirror. Crowell decided it must be a reflection from an iceberg. But he saw it again and again. Then he thought he saw a puff of smoke at the spot where the light had flashed. He called the Norwegian captain, handed him the glasses and said, "Take a look, skipper. What goes on?"

The captain studied the spot intently. More flashes and another puff followed. Somebody was signaling up there on that big rock. No doubt about it. Might well be Germans, the two men agreed; some gang that had been missed in the big Greenland roundup, waiting for rescue or maybe expecting a call from a U-boat with supplies.

"If they're Nazis," said Crowell, "let's go get them."

Back to Life

A boat was lowered. Into it went the major, two brother officers and three Norwegian seamen, armed with tommy guns and revolvers. As the boat approached there, the signals ceased, but the landing party could make out human figures on the ledge. As they came inshore they cocked their guns and covered us.

Crowell said later that he yelled to us to come down the cliff unarmed and to keep moving. I wouldn't doubt it, but none of us heard him, because Greenaway, Snow and I had passed into unconsciousness.

Our rescuers scaled the wall of rock, clambered onto the ledge and found us there. The major found my identity disk. "This man's an American," he said to the others, "and I think he's dead."

Two of the Norwegian sailors examined Ted and Ron, and pronounced them finished--frozen to death. Then one of the officers tried pouring raw rum down our gullets and we showed signs of life.

Getting us down the cliff and into Polar Bjorn's boat must have been a superhuman task, for the knowledge that we were saved seemed to have drained the last drop of our remaining strength. Greenaway's feet were so badly frozen that he couldn't put them to the ground. Snow's and mine weren't much better. But somehow our rescuers eased us down the rock and into the boat.

Back aboard the whaler they wrapped us in blankets and plied us with hot cocoa. The rest is strictly routine again--down the coast to a rescue station as soon as Polar Bjorn's Diesel had been coaxed back to life; thence in a United States Guard cutter to a base hospital on the west coast; more rest and temporary repairs, until a plane came from Canada to get us and flew us back to Montreal, via Labrador. There we were parked in hospital for a long stretch.

When this was written, Ted Greenaway was still there, for his frozen feet had to undergo wholesale toe amputations. Ron is back on duty, flying the sea lanes. I'm doing a stretch as test pilot, waiting for my feet to toughen up sufficiently to let me wear hard-leather boots again.

While we were still in the hospital together we used to try to figure the odds in the bets we'd parlayed with destiny--the spin, the crash landing on the Atlantic, our twenty-four-hour voyage through the ice floes in the rubber dinghy, the chances in favor of dying by exposure and starvation; the possibilities of a ship passing and, if one should pass, the odds in favor of its engine breaking down, forcing it to lie off-shore long enough for its people to see our feeble signals, and so on. We gave up that kind of calculating when the pay-off odds were climbing into the millions. As far as we three are concerned, we're ready to call it the Miracle of Umanarsuk and to let it go at that.

MEN, DOGS, AND MACHINES SAVE FLYERS WHO CRASH IN THE ARCTIC

The crew of the PBY patrol plane were hopelessly lost. They hadn't the faintest idea as to their exact location over the wilds of Greenland close to the Arctic Circle. They checked their air speed, their altitude, and their compass. They looked at each other with that half-amused, half-puzzled look that men have when they are completely baffled and not quite scared--yet. Everything seemed to be in order about the plane, but there was a peculiar feeling of steadiness about their flight. Outside the frosted windows there was nothing but blinding snow in all directions.

Suddenly one of the men got an inspiration. He forced open the door of the plane and peered down into the swirling snow. For a moment he hesitated, then calmly stepped out of the plane--apparently into open space.

The rest of the crew watched with bulging eyes. They saw him run alongside to the front of the plane, where he stopped and signaled for the pilot to kill the engines. Speechless, the pilot did so, and the man ran back and climbed into the hull to tell his astonished companions that they had been sitting on the ground in a snow bank with the engines wide open. They had slid up the gradual slope of a snow-covered mountain and stopped, still apparently several thousand feet in the air and going along at normal speed. To this day, they don't know how long they "flew" on the ground.

Usually crash landings in the arctic are another and more tragic matter. That is why the Arctic Search and Rescue Squadron of the North Atlantic Division of the Air Transport Command was formed. The members of this rugged organization say they can get a man out of almost any predicament. Their record of almost 100-percent recovery of personnel, alive or dead, since the formation of the unit in 1943, backs them up.

As soon as the North Atlantic Division of the Air Transport Command had demonstrated that they could fly the North Atlantic around the calendar, as well as around the clock, it became evident that they needed not only the regular air-sea rescue service already in action, but additional protection for men and planes down over land. This must be a service capable of covering millions of square miles of wilderness up to and above the Arctic Circle. At that time, the only means of rescue were hit-and-miss, the use of trappers, traders,

natives, and hastily organized groups of volunteers.

Realizing the need for quick rescue in the stunning cold of the arctic. Lt. Col. Norman D. Vaughn, then in command of the ATC base at Goose Bay, Labrador, suggested that perhaps the solution might be dog sleds and trained rescue personnel maintained at permanent bases ready for instant action. The Colonel had already proved the value of dog sleds on the Greenland ice cap when he had taken part in the salvage of tactical aircraft forced down on the way to Europe. He was put at the head of the unhatched Arctic Search and Rescue Squadron of the ATC's North Atlantic Division, with orders to establish bases and obtain and train the required personnel.

Army personnel records were scanned for men with arctic experience, ski experience, dog-sled experience, and any other backgrounds that might fit into the picture. Whenever a suitable man was located, he was transferred to the about-to-be born unit, and others not yet in the service were contacted and urged to enlist. These included trappers, traders, and explorers; guides, and members of former arctic or antarctic expeditions. Every man had some peculiar qualifications for this job.

The unit maintains contact with about 20 bases where planes can be landed, and with dozens of tiny weather stations scattered over northern Maine, Labrador, Baffin Island, Newfoundland, and Iceland. Many of these weather stations are serviced only once a year when planes can land near by on flight strips carved out of the arctic waste. The rest of the year they are supplied by parachute.

For lack of emergency landing fields across the North Atlantic route, the dog sleds and other special equipment are kept at key emergency bases from which they can be flown into areas where planes are reported down.

The first duty of the rescue service is to locate the lost plane and then fly in medical aid and cold-weather equipment. The weather stations help find the downed ship; if its radio equipment can be operated, it is only a matter of a few hours until the ASR planes are overhead dropping emergency equipment. If radio directions are impossible, signal panels are displayed by the crew members to inform the search planes of conditions at the crash.

All necessary supplies can be dropped to survivors by parachute, and the doctors of the service go right along too, via the silk. If the wreck is too far inland to be reached

by sleds and dogs from a near-by base, they are flown to the area and dropped on 'chutes for the long trek out with the injured. Most of the dogs "hit the silk" with nonchalance.

Skilled in the use of special arctic medical kits, the doctors of the unit are also trained in the use of parachutes, although only a few have had occasion to use them in bringing aid to AAF personnel. Of those who have, Lt. Col. Daniel H. Maunz, who has twice performed appendectomies under trying circumstances, is an outstanding example.

His first unusual operation was late in 1943, upon a cook for a group of scientists studying weather conditions somewhere on Baffin Island, beyond the Arctic Circle. An appeal for aid for this man was relayed to a base of the North Atlantic Division late in 1943. The base surgeon made a diagnosis by radio and decided that there was no time to lose.

Flight Surgeons Maunz, and Yearwood volunteered to fly to the aid of the man, with the understanding that, if the plane was unable to land, they would parachute to the ground ready to operate. Experienced parachute men went along to give them last-minute instructions.

When they arrived over the tiny base, it was obvious that a landing was impossible. Undaunted, the two doctors prepared to bail out with their medical kits. Just before Captain Yearwood was ready to jump, his 'chute fouled, and it was hurriedly decided that Colonel Maunz would jump alone. Neither of the two men had ever used a 'chute before, but out the Colonel went, counted calmly to seven, and yanked the rip cord. When he landed, jarred but unhurt, he was surrounded by the personnel of the base and all the Eskimos living in the area.

The operation was a success, and three weeks later the cook was back on the job--a job, incidentally, taken over by the doctor in the meantime. An ironic touch to the rescue and operation was the fact that, in attempting to build a snow-mobile with an old engine found at the base, Colonel Maunz let it fall on him and broke a leg. He had to set his own leg and wait 11 days for his own rescue. The intervening time was spent giving medical aid to the Eskimos and teaching first aid to the base crew. Colonel Maunz received the Soldier's Medal for this mission.

Maintaining radio contact is of paramount importance. Before the crash, if possible, the radio operator sends out his approximate location and any other data that might aid the rescuers. After the crash, he sends additional data if the

condition of the operator and equipment permits.

When it is known at headquarters that a plane is going down or has crashed, a search is at once organized with all units co-operating. The time element is all-important. With the approximate location of the crash established, the search planes take off, flying a grid pattern over the area. Often the natives give invaluable aid with reports of finding wreckage, hearing a plane in distress, and noticing sudden explosions or fires.

I flew a search mission in Newfoundland based on such a tip turned in by a "Newfie," as the Yanks call a native. The lost ship had last been reported over the field three weeks previously in zero-zero weather and had then just disappeared completely. The ASR crew of the field was still looking for it in spite of heavy snows that had fallen in the meantime. First we flew a grid pattern over the area where the "Newfie" reported that he had found what he believed to be pieces of a plane; then we really went down on the deck and took a closer look for anything that might indicate the crash. Two days later, the plane was found deep under the snow.

Finding a crashed plane is one of the toughest jobs in the world, particularly in the northern wilds. Rarely does the ship finally come to a stop still resembling an aircraft. In summer, it most often looks like bits of metal sawdust sprinkled on a green carpet; on the deep winter snows, it is a dark smear speckled with bits of tin foil. Frequent heavy snows make the search doubly hard, and years may pass before the wreck is located if it is in a particularly isolated area.

Once the wreck is spotted from the air, the searching plane radios directions to the ground parties proceeding from the nearest base by dog sled, snow tractor, old reliable Army mule, Weasel, or "shank's mare." Sometimes the rescuers are able to drop mechanized equipment for the salvage or repair and take-off of flyable planes and thus make a double rescue of personnel and plane.

Take, for example, the case of veteran ATC pilot L. J. ("Chuck") O'Connor. In February 1943, he was flying a Consolidated C-87 (a transport version of the Liberator bomber) when he was forced down on the ice of an unknown and nameless lake in northern Canada. The plane was undamaged but unable to get off again. The temperature was down to 70 below zero. Radio contact was made the following day, but owing to the severe cold, the octant used to establish the location was two and a half degrees off, with the result that the plane was not found for a week.

Once located, the crew were furnished with everything imaginable to make for arctic comfort--well, all right then, existence. O'Conner and his crew served as a sort of involuntary testing laboratory for all sorts of arctic equipment under development. For 32 days they lived at the scene of the landing while ways and means were tried out to prepare a runway for the plane so that it might be flown out.

A snowplow on a Ford tractor was dropped to them, along with other items of runway-building equipment, but the snow was too deep for them to move. Holes were chopped in the ice, and the lake water was pumped up and sprayed on the snow to form a frozen runway. This did not work. The water soaked into the snow and refused to freeze at all, merely making the snow mushy and even harder to handle. Eventually, however, runways were cleared, and the plane was flown out. The scene of this rescue is no longer nameless, for the Canadians have since dubbed it Lac O'Conner.

Much of the rescue work is possible through the use of sled dogs and their equipment. Nearly all of the 100 downed flyers brought out of the wastes since the inception of the ASR units in 1943 have owed their rescue in part to the use of dogs, many of them born in the service.

The dogs chosen for the work are picked for their strength, speed, endurance, and good nature. Many are trained at the War Dog Reception Center in Montana, while others have been trained at Presque Isle, Me., where nearly 100 dogs and their attending personnel are stationed.

In all, about 29 dog teams are spread over the U.S. Army bases in the North. Besides the huskies used with sleds, Saint Bernards are used as individual pack dogs or to pull pulkas, which are like snow shovels without handles. These small plywood, boatlike affairs can carry either several hundred pounds of cargo or an injured person through the underbrush.

Working in close co-operation with the Arctic Search and Rescue Squadron are the crash boats of the Coast Guard and other service units, while inland, the RCAF, the Forest Services, and the State Police and ski patrols co-ordinate their facilities with those of the service. Natives, hunters, traders, and trappers also pitch in to help the rescue gang bring 'em back alive to fly again.

The splendid record of the Arctic Search and Rescue Squadron will serve not only as a tribute to American courage and ingenuity but as a foundation for all similar organizations for

the greater safety and peace of mind of the millions of air travelers of the future across the arctic routes. Such travelers will remember with pride and gratitude the valiant and vigilant crews of the Arctic Search and Rescue Squadron of the Air Transport Command of the AAF.

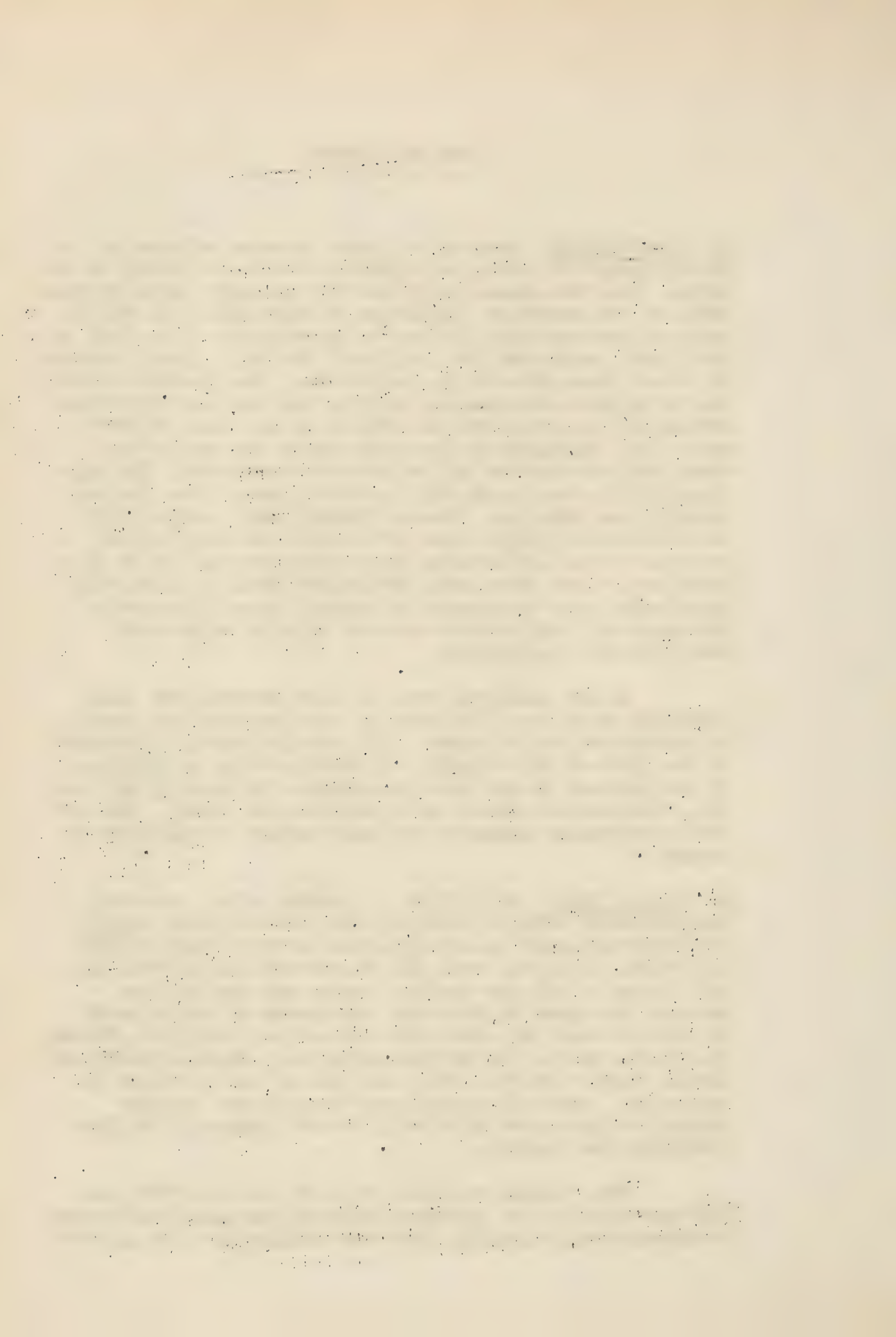
KEE BIRD RESCUE

a. Observations: Contrary to press releases relative to the daring exploit of making an extremely dangerous landing on an Arctic lake, the actual facts are that through a thorough knowledge of the mechanical properties of salt and fresh ice, it was predetermined that the ice in the vicinity of the B-29 aircraft would withstand the landing of the C-54. Wheel landings on frozen lakes and sea ice are not new. The Russians before the war made a comprehensive study of ice landing strips and determined the mechanical properties of both sea and fresh water ice. Similarly in Greenland during the war several wheel landings on snow and ice surfaces were made. The only unpredictable aspect was the depth and type of snow surface covering the lake ice. However through radio contact with the stranded B-29 crew, this information was supplied and previous to the C-54 landing snow conditions similar to those described at the scene were examined at Thule by thoroughly experienced men, who understood through actual experience the amount of drag that the various types of snow would have upon the landing gear.

It was predicted that the C-54 landing gear would withstand up to ten (10) inches of any type snow that could be encountered at the scene. With this information presented to the pilot of the aircraft, it remained only to determine if the approach to the lake was suitable for landing and take off. This was determined by flying over the scene. The survivors organized themselves as human markers to indicate the runway.

b. Action Taken: C-54 #2640 Lt. Cavnar, pilot, departed Westover Field 0830Z 23 February 1947 to search and supply B-29 aircraft crash landed 250 miles north of Thule at 80° 15'N 61°W. While en route from Westover Field to BW-8, Captain Dorsey of ATC Air Weather Service and Captain Shaw examined the chart to determine what means of rescue could be used to reach the survivors. It was decided by Lt. Cavnar, the pilot, and two (2) Arctic specialists, Captain Dorsey and Captain Shaw, that the C-54 could land on the lake near the survivors. Approval to carry out the plan was obtained through radio contact with Brig. General Haynes of the Newfoundland Base Command.

Upon landing at BW-8, 1911Z 23 February 1947, the C-54 was refueled and emergency survival equipment sufficient to provide food, clothing, heat and shelter for both the C-54



crew and B-29 crew was loaded on the C-54. The emergency equipment had been flown from BW-1 to BW-8 by the BW-1 C-54. The BW-1 C-54 was then requested by Captain Shaw to stand by at BW-8, loaded with more emergency equipment, in the event that it was needed. The Alaskan ski-equipped C-47 was requested to stand by at Crystall II because landing strips at BW-8 and Thule had no snow on the runways. However, if needed, it could land on Lake Ferguson at BW-8 and on the bay ice at Thule.

C-54 #2640 departed BW-8 at 2105Z 23 February for Thule. During the flight from BW-8 to Thule contact was established with the B-29 #1678, and it was discovered that the B-29 was actually on the lake where it was planned to land the C-54 #2640--a mistake of 1° had been made in longitude of the plane's position. The new position was 80°15'N 60°W. The mistake was discovered when the pilot of the B-29 announced that his plane was on the lake. Further information was received from the B-29 pilot that snow surface on the lake was smooth rolling snow drifts varying from two (2) to ten (10) inches in depth with a hard crust top. This information confirmed the predictions of Captain Dorsey, weather forecaster, who has been flying with the ATC Nanook crews. C-54 #2640 landed at Thule at 0131Z 24 February. Further discussion was held with Mr. Edward Goodale, an Arctic specialist, who is official in charge of U.S. Weather Bureau Station at Thule. He concurred in the established plan, and willingly agreed to accompany the C-54 to the scene to assist if anything went wrong. He also supplied necessary shovels in the event that they were needed to clear a runway for take off after landing at the lake. The take off was planned for the following morning at about 9:30 local time in order to arrive at the scene at high noon when the light would be best. (At that latitude and time of year the sun does not appear above the horizon). At Thule the sun appeared above the horizon for the first time this year on 24 February.

Previous to take off from Thule, 24 February, Captain Shaw showed Lt. Cavnar all types and depths of snow that would be encountered at the scene in order to make him familiar with landing surface conditions.

Take off of C-54 #2640 from Thule was at 1410Z 24 February. Upon arriving at the scene which was easily located due to the fact that the B-29 crew had built a fire of engine oil and rubber rafts which threw off a column of black smoke, Lt. Cavnar made two (2) passes over the scene, and then landed with very little difficulty at 1545Z. He

then taxied the C-54 up and down to break out a take-off runway. Upon completing this, all non-essential equipment not needed for this flight was removed from the C-54, while the engineers connected the electrical fastenings to the four (4) jato bottles which had been fastened on at Thule, and the survivors were taken on board. Previously the pilot of the B-29 destroyed all classified material and equipment by burning and smashing with an axe.

On the take off from the lake at 1625Z, Lt. Cawnar ran the engines up with brakes set until the plane started to slide. Brakes were then released and using 14° flap reached a speed of approximately fifty (50) miles per hour, whereupon 20° of flaps were used and the jato bottles fired. The plane seemed to jump into the air. It is estimated that the plane grossed approximately 55,000 pounds.

After the take off, Lt. Pope, medical officer from BW-8 examined the survivors and found no frozen parts, but did find mild cases of shock and exposure. Upon arrival at Thule at 1804Z, the survivors and crew were fed a steak dinner by Mr. Edward Goodale. After take off at Thule for Westover at 2200Z, Lt. Pope directed that all survivors stretch out on sleeping bags and kapok mattresses and sleep as much as possible during the long flight. Suitable accommodations at Thule were not available to rest survivors at that station. It was necessary for Lt. Pope to administer sleeping tablets as the survivors were extremely restless and nervous. The flight from Thule to Westover was made without further unusual incident.

c. Action Recommended: That special survival equipment be frequently checked by an officer thoroughly familiar with the needs for the Eureka Sound Projects flights. Discussion with the survivors of the B-29 revealed that a suitable stove or other method of heat was not carried by the aircraft.

That a survival training course for all crew members on far northern flights be established within the Division. (Goose Bay has necessary actual conditions).

That Eureka Sound Project aircraft be equipped with all necessary navigation equipment for polar flying and that navigators be thoroughly briefed in all the problems of polar navigation by the navigator of C-54 #2640, Lt. William Seward, or one of equal experience.

That all pilots of Alaskan Divisions be advised of the location and facilities of the Thule air strip. That

the Alaskan Division take immediate steps to procure at least two (2) ski-wheel C-47 aircraft. The ski-wheel construction to be such that the aircraft can take off from a dry runway with no snow and land and take off on a snow surface on the same flight.

That tests be made in all conditions which will be encountered by ATLD crews of presently available survival equipment and comprehensive reports and recommendations be prepared of the tests. This is necessary because different types of equipment are required in the different climatic conditions of the Arctic. All equipment used in Alaska is not satisfactory for Greenland.

That D.F. equipment be installed at Thule, and the new Eureka Sound Station.

That a study be made of existing records and further observations be made through aerial flights to determine the best locations for the establishment of weather stations and ice landing strips on the Arctic Ocean ice. Such stations will be needed for Air Transport Polar routes.

OPERATION CANON¹

Preliminary Planning
(30 September to 4 October 1947)

"Operation Canon" began for Headquarters of Prairie Command, Winnipeg, Manitoba, when the Directorate of Air at Army Headquarters, Ottawa, requested a teletype conversation with GSO 2 at 1645 hours, 30 September 1947. In this conversation the condition of the Reverend Canon J. H. Turner, an injured missionary, was stated and a plan suggested for a paradrop of a rescue team to include a medical officer and two Signals operators. The missionary was stationed at a small mission at Moffet Inlet on the northern tip of Baffin Island. The size of the dropping party suggested by Army Headquarters was four, together with necessary medical stores, signal and other equipment. Little information was available at Prairie Command regarding Moffet Inlet, but those maps and photographs which could be obtained from other sources were to be sent forward as soon as possible.

All the available information was passed to GSO 2 (Air Liaison) at HQ 11 Group, RCAF, Winnipeg. Executive instructions were received and passed to all concerned the same night. "Operation Canon" was under way.

About ten to five in the evening a telephone message from Prairie Command was passed to the Officer Commanding the Army Wing at the Joint Air School Pivers, Man. The gist of the remarks of the GSO 2 was: "George, write this down. A teletype has just been received from Army Headquarters to the effect that a missionary has been severely wounded at Moffet Inlet, Baffin Island. He must receive immediate aid. We will probably parachute a small party at the mission. It should include a medical officer and signals operators. Their task will be to keep the wounded man alive until he can be evacuated safely--

¹This review was prepared by Headquarters, Prairie Command in the form of a preliminary report on the army aspect of "Operation Canon," and submitted for publication in the JOURNAL by the Directorate of Air, Army Headquarters, Ottawa. It tells of the part played by the army and air force in the rescue of Canon J. H. Turner, an injured missionary, at Moffet Inlet on the northern tip of Baffin Island. Readers will recall that Canon Turner subsequently died of his injuries. Photos were obtained from the Directorate of Public Relations (Army).--Editor.

probably by an aircraft operating off the ice which may be strong enough to take the aircraft in about a month or so. The party will maintain wireless contact with operational headquarters and will reconnoitre the surrounding area to locate a suitable landing strip--possibly on a lake. Any questions?"

"Plenty," was the reply, "but I don't suppose you have any more information."

"No, that's all I have. This is a warning order only--all instructions will be passed to you through the normal channels--RCAF are directing Search and Rescue generally--Good Luck".

This brief message from Prairie Command was the first intimation received at the Joint Air School about the mission which was later named "Operation Canon." It was passed to Lt. Col. D. R. Ely, MBE, Officer Commanding the Army Component of the Joint Air School, who conferred with Group Captain M. G. Doyle, Commanding Officer of the School. It was then directed that a preliminary conference would be held in the Operations Room at 1900 hours that evening.

This was the first of several meetings held, and a brief summary of what happened at each will be given here for the purpose of emphasizing the planning necessary for such an undertaking. The Library was notified early and a lot of reference material was made available. Maps of the area showing average ice and weather conditions in the North from month to month were produced, together with the positions of weather stations, radio beams and airports.

The issue of the warning order took little time. Major George Flint was placed in charge of the Army side of the operation and Flying Officer Bob Race was detailed to head the Air Force team. A payload of 4,500 lbs. was allocated for army purposes and the respective commanders were then instructed to proceed with their planning.

Another meeting was then held of army personnel only in Major Flint's office. At that time the dropping team was detailed as follows:

Commanding dropping team: Capt. G. D'Artois, DSO.
 Medical Officer: Capt. R. Willoughby.
 Signallers: Sgts. Cook and Judd.

Duties were also allocated for planning as follows:

Signals arrangements: Major P. R. Layard, MBE.
Preparation of stores for air dropping: Capt. I. C. Stewart
Co-ordinator of supplies: Capt. R. B. Firlotte.

Capt. D'Artois was instructed to prepare a list of requirements based upon an anticipated stay of one month and to present them at a later meeting.

The Medical Officer was instructed to have his instruments and special supplies ready for packing for air drop by 0830 hours the next morning.

The final meeting of the evening was held at 2230 hours. The RCAF had received a similar warning order for the operation. Because of the necessity for carrying additional emergency equipment the total Army payload was reduced to 3,500 lbs. Capt. D'Artois then presented his requirements of food, clothing and equipment. A representative of the Quartermaster advised that a number of items were not available at Rivers and suggested that they might be picked up at Fort Churchill where the party would stage. A telegram listing these items of winter equipment was prepared for despatch the following morning. The co-operation of those at Fort Churchill assisted greatly in the success of the preparations. Medical supplies were obtained through the Command Medical Officer and made ready at Stevenson Field, Winnipeg.

It was anticipated that the rescue team could land at Canon Turner's Mission, and that adequate medical assistance and advice would be available from the Medical Officer. AHQ had advised that no operation would be attempted without prior reference to that HQ except in case of extreme emergency. Communications were to be established to Coral Harbour and to Arctic Bay as soon as possible and reconnaissance was to begin immediately to discover a suitable lake on which to land a transport aircraft.

All next morning preparations continued. At a meeting held at 1030 hours information was received that as it was desirable that the aircraft to be used on the last lap of the journey should be equipped with Loran and other navigational aids; therefore aircraft would be exchanged at Churchill.

At about noon information was received from II Group, RCAF, Winnipeg, that the operation had been approved but that the aircraft would not leave Rivers until 0800 hours the following morning. The reasons for this was that a former missionary at Moffet Inlet, the Reverend Flint, would arrive at the Joint Air School later in the day to give the party all information

which he possessed about the mission and the characteristics of the surrounding terrain.

Later in the day, Sgt. Ross was detailed as an air supply member of the party. His duty was to drop extra supplies which might be required, and, in the event of urgent need, to parachute to assist the party.

The Rev. Flint was late in arriving at Rivers. As some of the dropping party lived at Shilo Camp, some 47 miles distant from Rivers, and wished to see their families before leaving, a preliminary briefing was held at 2100 hours. The information was repeated and instructions given about dropping, signals, procedure and the selection of a landing strip for the evacuating aircraft. This had just been completed when the Rev. Flint arrived. He had flown all the way from Ottawa and was tired and hungry, but readily agreed to do what he could immediately, so that those desiring to get home could leave as soon as possible.

The Rev. Flint had spent some two years at Moffet Inlet and was well acquainted with the area. He brought with him photographs and sketch maps which were projected upon a screen, enlarged so that they might be seen by all. At the same time he elaborated verbally on the subject. This briefing was of great value, and any idea that the drop would be a simple one was quickly dissipated. The Mission station itself was a very small house constructed on a small spit of land approximately 200 feet long and 110 feet wide. Back of the mission, and rimming the coast for miles, was an ugly, precipitous escarpment some 400 to 600 feet high.

It was obvious that no drop could take place close to the Mission since the water temperature was reported at 29 degrees, which would quickly prove fatal to a parachutist landing in the water. Attention then turned to the back country behind the cliffs. This was reported to be rocky, littered with boulders with a number of small lakes. It was generally described as "very rugged."

Because of this unpromising information, Major Flint, who had not intended to accompany the party, decided to do so to make the decision if, and where, the drop would take place. The drop would have to be made inland, and during the planning stage, due to lack of detailed information, it was not possible to designate a specific dropping zone. The first requirement would be to reconnoitre a suitable dropping zone as close as possible to the Mission. Proximity was important because of the weight of stores which would have to be transported

from the dropping zone to the Mission. The largest item was a 52 set, which, with its gear, weighed some 900 lbs. Knowing the country as well as he did, the Rev. Flint was somewhat pessimistic about the operation and the chances of its success.

The possibility of wireless failure or defects was countered by the provision of ground strips and the establishment of a visual system for communication from ground to air. Through the Department of Transport and the Army Signals at Churchill, a careful check was made on all operating frequencies and schedules of wireless stations in the North. All of these stations were alerted and warned of the intended rescue. The aircraft was to leave Rivers, proceed to Winnipeg to load additional stores and to allow the Medical Officer the opportunity of a conference with the Command Medical Officer, thence on to Churchill where aircraft were to be exchanged, further equipment was to be loaded and then on to Coral Harbour, Southampton Island. This would be the immediate base for the operation from which the aircraft would proceed to Moffet Inlet. All administrative matters were carefully planned and quickly organized, ensuring every chance of the completest success.

At HQ Prairie Command, a special roster for duty officers, to include only experienced staff officers, was established. This was to ensure the quickest handling of all matters pertaining to the rescue; the GSO 2 was detailed as the co-ordinating officer to whom all information was to be passed by the special duty officer. It was arranged that all messages with reference to the rescue would be passed to HQ II Group, RCAF, HQ Prairie Command, and the Joint Air School. In this way it was assured that all relevant information would be available to all concerned. On receipt of information from any source, a wire would be despatched to ANQ relaying the purport of the message.

Because of Major Flint's decision to accompany the party, it was necessary for Sgt. Ross to stay behind and follow on to Churchill on a plane leaving later that day.

The party left Rivers at 0820 hours, 2 October. Upon arriving at Winnipeg it was met by Brigadier R.O.G. Morton, CBE, and Air Commodore Costello, CBE, and other service and press representatives. A little Eskimo girl, Chinook, who had recently been flown from Coral Harbour for treatment of burns, was placed aboard the aircraft which soon left for Fort Churchill.

Immediately after landing at Churchill a weather forecast

was obtained. As it was not too good, F/O Face decided to remain there for the night. As it transpired this time was used to the very best advantage.

After lunch Sgts. Cook and Judd accompanied F/L Morobito, the wireless operator of the aircraft, and Lieut. Kohler, Royal Canadian Signals officer, to visit the Department of Transport representative in the town of Churchill. The remainder of that afternoon was required to complete all signals details.

At the same time Capt. Willoughby liaised with Major Lipsett, the Senior Medical Officer at Fort Churchill, and Major Flint and Capt. D'Artois drew the clothing and equipment previously requested by teletype and, aided by other military personnel there, transferred the load to the aircraft (later nicknamed the "Snowbird" and subsequently "The Blizzard Belle").

The value and efficiency of the detailed preliminary planning was exemplified in the successful organization of the rescue party so that only four days after receipt of instructions to stand by for the operation, the first stage had been completed at a distance of some 1700 miles from the initial base.

The party left Fort Churchill at 0950 hours, 3 October, and arrived at Coral Harbour, Southampton Island, North-West Territories, at 1300 hours. The remainder of the afternoon was then used to refuel the aircraft and auxiliary tanks which had to be done by hand from 45-gallon drums.

The rescue party was not in contact with the Mission at Moffet Inlet. Their job was to aid the wounded man until he could be evacuated. If, by this time, he was beyond help, then the situation would call for quite different action. In order that this information on the Canon might be obtained before a drop was made, a message was placed in a streamer. This was wrapped in two fluorescent signal panels ready for dropping.

The next day dawned clear and bright but a delay was encountered when the starting motor on the port engine refused to function. This difficulty was overcome by starting the motor with the aid of a rope tied to a tip of the propeller. Although not normal procedure, it worked and at 0925 hours the aircraft left Coral Harbour for Moffet Inlet. The flight was uneventful. The army personnel, having nothing to do, read and slept, and Capt. D'Artois took several rolls of moving picture film of terrain features that might be used at some later date.

At 1248 hours the aircraft arrived over Moffet Inlet. The ground up to the south side of the Inlet was snow covered and rolling, and would have made an ideal area to drop. The north side, on the other hand, was even more rugged than expected after the briefing by the Rev. Flint. The Inlet was fairly free of ice and looked blue and cold. This feeling was accentuated by the sight of two dazzling icebergs on the horizon. The Mission was not to be seen and the maps available did not prove too accurate in detail. The shoreline contained numerous indentations of various depth and the search was difficult and made more so by a low fog which covered portions of the Inlet. One house was spotted but it did not answer to the description and there was no sign of life. To be on the safe side the radio operator at Arctic Inlet was asked if he knew of another similar structure in the neighbourhood. He replied "No" so we told him of the one sighted and its approximate location. The search continued. Then Sgt. Judd came up from the cabin and said that a boat and building had been seen through a break in the fog. We turned back and at 1340 hours spotted the Mission buildings. The aircraft made a circuit while the rear door was being taken off. On the run in over the Mission people could be seen waving, and Major Flint dropped the following message:

"WE ARE TO HELP CANON TURNER. IT IS PROPOSED TO PARACHUTE A SMALL PARTY INCLUDING A MEDICAL OFFICER FOR THIS PURPOSE. OWING TO THE RUGGEDNESS OF THE GROUND MEN CANNOT BE DROPPED SAFELY NEAR THE MISSION BUT WE INTEND DROPPING THE LESS FRAGILE STORES AT THE MISSION AND THE MEN AND OTHER EQUIPMENT IN THE DEER COUNTRY. DIVIDE YOUR ESKIMOS INTO TWO PARTIES. KEEP ONE PARTY AT THE MISSION AND SEND THE OTHER TO THE TOP OF THE CLIFFS TO GO TO THE AID OF THE PARTY WHEN THEY DROP. PLEASE ACKNOWLEDGE BY SIGNALLING A REPLY TO THIS QUESTION WITH THE PANELS ATTACHED. ARE WE STILL IN TIME TO BE OF HELP?"

GEORGE FLINT MAJOR
CANADIAN ARMY"

☐

YES

☐
☐

NO

Owing to the amount of time and gasoline which had been consumed in locating the Mission, it was necessary to locate a dropping zone and commence dropping as soon as possible. As soon as the message was dropped the aircraft began to reconnoitre the back country for a suitable area. As we had been informed previously, this was very rugged and appeared to be of rock, littered with boulders, windswept of snow, and dotted with tiny lakes. After several circuits over the area one small lake was selected as a dropping zone. This was estimated to be about 1000 feet above sea level, 250 yards long, and 100 yards wide. It was about five or six miles in a direct line from the Mission and considerably longer on foot, but no closer one could be spotted. Capt D'Artois concurred in the selection, and the aircraft returned to the Mission where one panel, meaning "Yes", had been laid out in answer to our message.

Dropping commenced at 1400 hours. A petrol drum weighing 200 pounds was dropped first to test the thickness of the ice, and a smoke bomb was dropped at the same time to assist in estimating the speed and direction of the wind.

The drum was seen to land safely, and from the result it was estimated that the ice was strong enough and that it was covered with four to five inches of snow.

Dropping of stores then commenced. The gasoline had been carried for a generator which would keep the batteries of the radio set charged. The generator was then dropped--this weighed 150 pounds. Then followed food, tents, sleeping bags, weapons, ammunition, packboards, cigarettes, and medical stores. Major Flint did the dropping, assisted by Capt. Willoughby and Sgt. Cook. Capt. D'Artois kept viewing the country from a window so that he would know it thoroughly upon landing. Soon it was time for personnel to drop. Sgt. Judd went first with a portable radio set, followed by Capt. D'Artois. Then the main radio set and batteries followed. The total weight of the set with spares was 580 pounds, and that of the batteries 300 pounds. These were seen to land, then on the last pass Capt. Willoughby and Sgt. Cook bailed out.

All the dropping was done on signal from Flying Officer Race, the pilot, and during the latter portion of the drop when Capt. Willoughby and Sgt. Cook were getting into their parachutes, excellent assistance was afforded by members of the aircraft crew.

All dropping concluded at 1455 hours. The aircraft made one more trip over the dropping zone and the Mission and then set course for Coral Harbour.

Sgt. Judd had his portable set in operation and contacted the aircraft before the whole drop was completed. He said that he had made a stand-up landing and that conditions were good. At the same time Capt. D'Artois could be seen heading for the Mission.

En route to the Mission, Capt. D'Artois was met by two Eskimos. He indicated that one native should contact the other three members of the paratroop team while the second should accompany him to the Mission. The overland journey to the Mission took approximately two-and-one-half hours because of the rocky hills, some of which ranged to heights of 400 to 600 feet.

Arriving at the Mission the Dropping Team Commander was met by Mr. John Cormack, Hudson's Bay Factor from Arctic Bay. He accompanied Capt. D'Artois to the Mission house and introduced him to Mrs. Turner, wife of the injured man. Capt. D'Artois then met the patient, assuring him that medical aid would arrive shortly. Canon Turner at this time was unable to speak with clarity.

With two Eskimos, Mr. Cormack and Capt. D'Artois left by boat for Bartlett Inlet which borders near the dropping zone. There they met the other members of the team who had been conducted to the rendezvous by the Eskimo sent by Capt. D'Artois. The party returned to the Mission by boat with the medical supplies.

EXAMINATION BY MEDICAL OFFICER

On arrival, Capt. Willoughby examined the patient. Canon Turner's left side was completely paralyzed . . . and there was a large bed sore on his lower back. Generally, his condition was much better than was expected. The most imminent dangers were the probable development of meningitis and the extension of the bed sore.

Treatment which then commenced and continued throughout the seven-week period consisted of regular dressing of the bed sore, administration of penicillin every three hours day and night, as well as administration of sulfa drugs and general nursing care. Capt. Willoughby arranged to carry out the necessary treatment each night, being assisted during the day by Mrs. Turner.

The first food in 14 hours that the paratroopers felt the urge to eat was a hot meal provided by Mrs. Turner. All members of the Ground Force were weary from the strain of the

day's operations and the food was most welcome.

The Mission house is 11 feet by 24 feet and contains two rooms. These were occupied by the patient. Mrs. Turner, their two children, and an Eskimo girl. Capt. D'Artois decided to use a shack, ten feet by seven feet, to house the team and store equipment and supplies. Living conditions for the seven-week period were primitive.

In the meantime, the aircraft was returning to Coral Harbour. Weather conditions had become worse, and so much time had been spent over Moffet Inlet that not enough fuel was left to carry the aircraft to an alternative airport if a landing could not be made at Coral Harbour.

A landing was finally effected there, however, at 1840 hours under a 200 foot ceiling. Eight hours and fifty minutes flying time had been required to accomplish the first part of this operation.

It had been intended to fuel the aircraft the next day 5 October at Coral Harbour, but an average wind there of 52 miles per hour (gusting to 77 miles per hour) made that impractical and there was no urgent need.

On the same day, with Mr. Cormack, Capt. D'Artois and the two sergeants returned to the dropping zone. There they collected the widely scattered equipment. This was made difficult by the complete lack of contrast between the snow and the white parachutes. A tent was then set up and the Number 58 wireless set put into operation. The Number 52 set was tested and found to be out of order. Throughout the afternoon and night, until 0625 hours 6 October the Signals sergeants worked without rest or sleep in an attempt to repair the damaged set. These efforts were not successful, however, although the receiver and supply units were put into operation. Batteries, however, went dead.

At Coral Harbour, 6 October, the wind had lessened to an average of 40 m.p.h. all day, but the aircraft was re-fuelled and some work was done on the starting motor. As the next flight over the Mission would be with a light cargo load, the pilot decided to carry four drums (130 gallons) of gasoline in the fuselage which could be pumped into the auxiliary tanks if bad weather was again encountered. All this time a dozen radio operators from all stations in the North were listening for signals from Moffet Inlet, but none was heard.

We now know that on the 5th of October none of the sending

sets at Moffet Inlet was in working order. On that same evening, however, a newscast was heard over the CBC at Coral Harbour to the effect that the party at Moffet Inlet had established communication through Coral Harbour. As this was not so, enquiries were made to determine whether communication had been established through some other point, but it was learned that the newscast had been made in error. That same night Major Flint received instructions from Rivers to return by the first plane as the drop had been successful and nothing further could be done until time to evacuate the party.

The party at Moffet Inlet was still active. Early on the morning of 6th October the radio equipment and parachutes were stacked and covered with a tent. Mr. Cormack advised immediate return to the Mission because of the possibility of a freeze-up in the Inlet. After loading the boat with supplies the party returned to the Mission.

On the suggestion of Mr. Cormack and the advice of Capt. Willoughby, Capt. D'Artois decided to move the patient and his family to Arctic Bay, 70 miles North of Moffet Inlet. Accommodation and medical facilities were better there.

Weather prevented a departure on 7 October. That afternoon a storm nearly resulted in damage to Canon Turner's whaler. To prevent the boat from being smashed on rocks, the team, with the aid of Eskimos, moved out to the whaler in a small boat and attached a block and tackle. The whaler was then manhandled until safely on the shoreline.

On 8 October another flight was made over the Mission. Radio communication was immediately established when it was learned that the large set had been damaged in the drop and that other supplies were needed. A message was also relayed to Arctic Bay stating that the party intended to try to move Canon Turner and his family to that place and asking them to prepare accommodation. These messages were also passed to Churchill to be relayed to operational headquarters, and the aircraft once again returned to Coral Harbour.

The following day the aircraft returned to Fort Churchill to obtain a new starting motor and pick up supplies which had already been flown from Winnipeg. Major Flint returned to Rivers and Sgt. Ross joined the "Snowbird" when it returned to Coral Harbour for its re-supply mission.

After the aircraft had paid its visit and received the messages, the Ground Team travelled overland to the dropping zone once more, and, with packboards, strapped the supplies

on their backs and returned. The terrain to be crossed was impossible for travel by dog team. This movement of supplies exhausted all members of the party.

On 9 October the boats were loaded and a stretcher fashioned for the patient. The Canon's boat was launched but weather prevented departure.

UNSUCCESSFUL VOYAGE

On Thursday 10 October the patient was put aboard the whaler. This proved extremely difficult because the boat could not be brought too close to shore due to rocks and thin ice. The weight of the patient (approximately 230 pounds) complicated the problem. The stretcher-bearers broke through the ice and waded through two feet of water to reach the vessel. The first boat, with the patient aboard, started the journey at 0820 hours. The second boat left one hour later. About two miles from the Mission thin ice was encountered but it did not halt the voyage.

The motor of the whaler went out of action early in the trip and the vessel drifted close to a large iceberg. However, Sgt. Judd was able to restart it, but rough water and ice slowed progress and at nightfall the party anchored in a small inlet for protection.

The following morning an attempt was made to complete the trip. The calm of the previous night had permitted the ice to thicken and the whaler was frozen in and was in danger of being crushed as its engine was inoperative.

Mr. Cormack and Capt. D'Artois manoeuvred the second boat through the ice until a line could be thrown to the whaler. Gradually the stranded craft was worked free and the two vessels returned to the anchorage of the previous night.

In view of the patient's long exposure, Capt. Willoughby explained that it would be necessary either to complete the journey immediately or return to the Mission. Meanwhile, an Eskimo who had surveyed the ice ahead from the vantage point of a high hill, reported it was impossible to proceed. The party then turned back. The return was made hazardous by thickening ice and the necessity of towing the whaler. The Mission was reached in mid-afternoon 11 October. Bitter disappointment was felt by all members of the party as a result of the failure to reach Arctic Bay.

The attempted trip had aggravated the patient's bed sore

and Capt. Willoughby decided that drastic treatment was necessary. On Sunday 12 October he operated. Approximately two inches deep and five inches across, the sore had become gangrenous. It was necessary to cut away the devitalized flesh. The Medical Officer was assisted by Mr. Cormack and Capt. D'Artois. Although it was not possible to administer an anaesthetic, the Canon displayed remarkable courage and stood up well under the ordeal. The operation lasted about twenty minutes.

Previous to this date, search for a suitable airstrip had been impossible as the ice was too thick for travel by boat and too thin for travel on foot.

TRIP IN BLIZZARD

On 14 October Capt. D'Artois decided that an attempt must be made to move the damaged Number 52 wireless set from the dropping zone to the Mission where efforts to complete repairs could be made more conveniently. On reaching the dropping zone, the commander and two sergeants strapped sections of the 450-pound set to packboards and commenced the journey back. The rough country and heavy load proved formidable. A slip or fall on the rocky hills might have meant irreparable damage to the set. The last portion of the trip was made at night in a blizzard and was climaxed by a descent down a six-hundred foot cliff back of the Mission. The previous day it had been necessary for Mr. Cormack to return to Arctic Bay.

On arrival, although worn, the team stripped the set to permit more rapid drying.

The 15th of October was spent in attempts to repair the set. The receiving unit was put into operation but the sender unit still was unserviceable. Further attempts at repair were made without success the following day.

The next day the RCAF Dakota arrived over the Inlet to carry out a re-supply drop. The first 'chute released carried a Number 29 wireless set which dropped into the sea 25 feet from shore. The remainder of the supplies were dropped with precision and messages were exchanged between the ground party and the aircraft. The medical supplies were undamaged. The Number 29 set was salvaged but salt water had caused extensive damage. Sgt. Judd was assigned to repair the set while Sgt. Cook continued work on the Number 52 set.

Using part of the Number 58 set and an unused circuit in the Number 52 set, Sgt. Cook completed repairs. At 1827 hours 18 October, the ground party made their first contact with

another station Arctic Bay since the team had dropped at Moffet Inlet on 4 October. Establishment of communication, through the initiative and improvisation of Sgts. Cook and Judd, proved an invaluable aid to the successful completion of the operation.

From 18 to 22 October Capt. D'Artois carried out several reconnaissance trips in search of an airstrip on the Mission side of the Inlet. On 22 October, due to a southeast wind clearing the ice from the Inlet, he made a reconnaissance by boat after arranging a rendezvous with Sgt. Judd at Willoughby Lake. The latter's delay in reaching Willoughby Lake by the overland route caused considerable concern. However, the two met late in the evening and returned safely to the Mission, having discovered a suitable airstrip.

On the 24th October, despite an extremely low ceiling of some 200 feet, F. O. Race carried out a re-supply drop of urgently-needed medical supplies, tubes for the wireless set, and newspapers. The low ceiling and high hills were a serious threat to the safety of the aircraft and only superb flying made the drop a success.

SEARCH FOR AIRSTRIP

Since landing at Moffet Inlet, Capt. D'Artois had kept a constant check on the thickness of the ice. On 28 October, having searched the area on the Mission side of the Inlet thoroughly for an airstrip without success, he set out to explore the territory across the Inlet. Canon Turner suggested an airstrip might be found there. From this date onward, the Ground Force Commander made a reconnaissance trip each day that weather permitted. His problem was to find an airstrip suitable for RCAF requirements as well as those demanded by the doctor for the patient. The distance that the patient could be transported in Arctic weather was a limiting factor. These trips were made on foot with a dog team and an Eskimo and averaged approximately 25 miles. In all, Capt. D'Artois covered approximately 300 miles in his search for the airstrip. Thin and shifting ice was always a serious danger.

On one occasion Capt. D'Artois fell through the ice and might well have lost his life. He returned to the Mission after being pulled from the water by an Eskimo boy, changed clothes, and set out once more.

Finally, on 2 November, Capt. D'Artois discovered a lake 23 miles South of the Mission. It was situated in the barren lands at the foot of the hills. Examination showed that more

than the 15 inches of ice required by the aircraft covered the lake. The approach from the South was suitable and the area was level.

For 11 days the Ground Force Commander camped at the lake in a tent, preparing the strip with markers and panels, and checking the snow and weather conditions. This information was forwarded to Sgt. Cook for relay to the RCAF. During this period a blizzard prevented an Eskimo from reaching Capt. D'Artois with fuel for his stove and lamp. In addition, a high wind smashed the tent pole, and Capt. D'Artois was forced to live for two days without either light or heat. He remained in his sleeping bag throughout the two days, waiting out the storm.

On 18 November Flying Officer Race attempted to reach the airstrip but was forced to return to Coral Harbour by bad weather. Capt. D'Artois then returned to the Mission on 20 November, his supplies having run low.

LANDING MADE

On 21 November word was received that the aircraft had taken off from Coral Harbour on another attempt to reach the airstrip. Capt. D'Artois left the Mission and proceeded to the airstrip. Half an hour from the airstrip he saw the aircraft circle overhead. Visibility was poor but through a break in the fog F. O. Race spotted the markers set up at the airstrip and decided to attempt a landing. With considerable skill he succeeded.

While landing, the wireless operator of the aircraft notified the Mission of the arrival of the Eskimo. The patient was wrapped in furs, blankets, and a sleeping bag and placed on a dog sled. The temperature was 24° below zero. The fastest team was used to move the patient. A second team conveyed Mrs. Turner and her two children, while a third team was used by Sgt. Cook, who closed the Mission before departing.

The intense cold was a danger to the patient but the precautions taken and the excellent time in which the dog team made the trip—three and one-half hours prevented serious ill-effects to Canon Turner.

While the patient was en route to the airstrip, Capt. D'Artois prepared the tent for his reception. A delay of approximately five hours took place before weather was suitable for a take-off.

At 2230 hours, aided by a flare path laid down on the 6,000-foot strip, the party took off and returned to Coral Harbour. Here, due to the cold and exhaustion suffered by the patient and passengers during this flight, F. O. Race decided to remain for five hours.

Early on the morning of 22 November the rescue aircraft departed from Coral Harbour, and landed at 1715 hours at Winnipeg, where the patient was admitted to hospital and his family turned over to the care of the Church of England.

HEADQUARTERS
NEWFOUNDLAND BASE COMMAND
Fort Pepperrell, St. John's Nfld.
APO 862, c/o Postmaster, N. Y., N. Y.

16 April 1949

SUBJECT: Report on Search, Rescue, and Recovery of C-82 Crash

TO : Commanding General
Newfoundland Base Command
APO 862, c/o Postmaster
New York, New York

1. On 24 March 1949, C-82 #7798 departed Crystal II for Resolute Bay, an approximate 5-hour flight. The aircraft carried a heavy-duty fork lift which was to be used on Project RESUPPLY for loading equipment to be taken from Resolute Bay to the satellite Arctic Weather Stations. After flying for approximately four (4) hours, mainly by dead reckoning based on predicted winds, the aircraft requested homing directions from Resolute radio. Since the latter station has no homing facilities, it was impossible to give such assistance. The aircraft was unable to use either pilotage or celestial navigation during most of this flight because of the combination of a solid overcast and a nearly solid undercast, coupled with complete snow cover of both sea and land surfaces below which rendered definition of shore lines practically impossible. An attempt was made by Operations Personnel at Resolute Bay to describe local cloud conditions over Resolute Bay in hopes that the aircraft could orient itself by them. However, at about 2230Z, the pilot informed Resolute Bay that he was about to land on an ice surface as it was getting dark, and he had only about an hour's fuel remaining. No further radio contact was made for the next five hours.

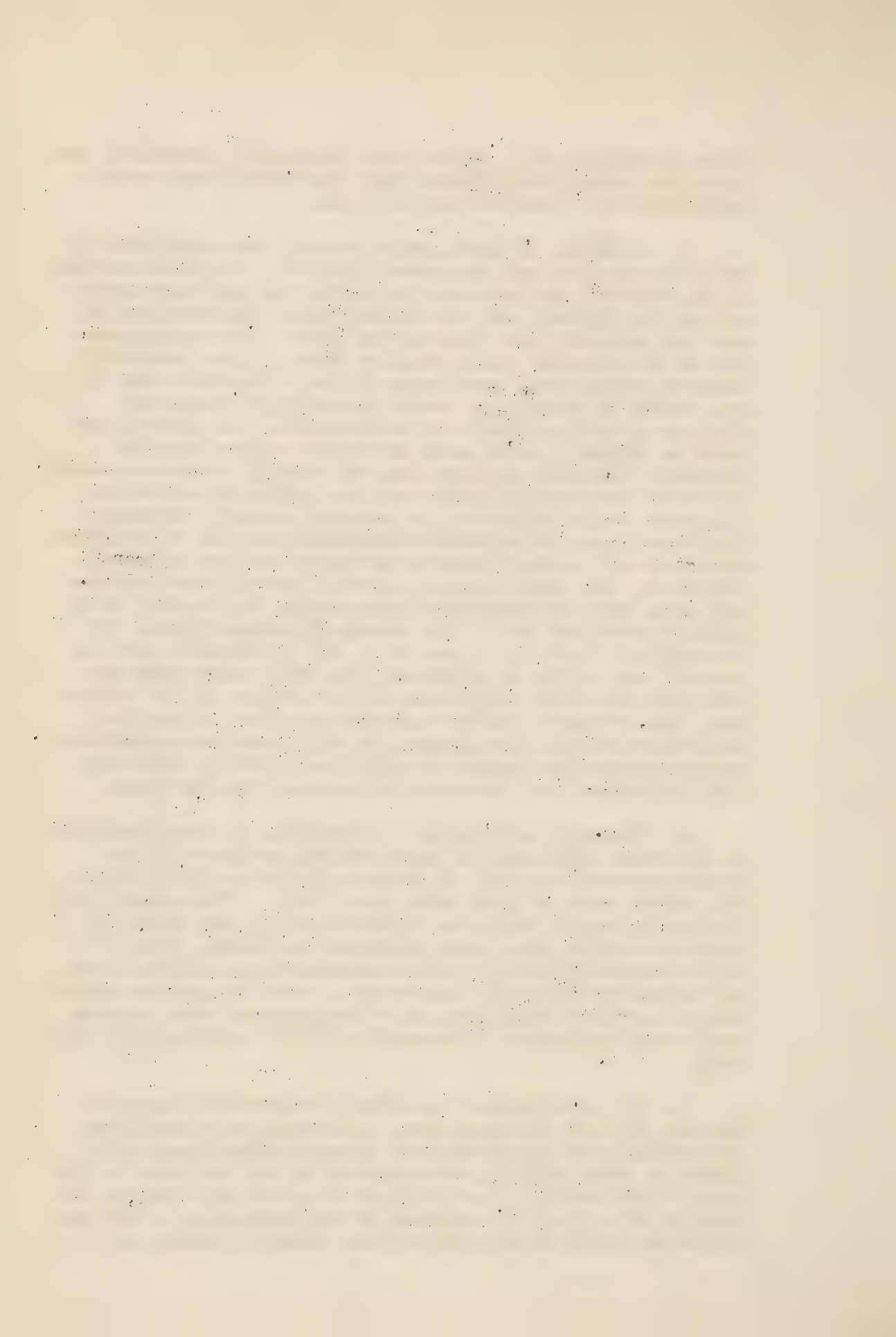
2. On the assumption that an extended search would be necessary, the Commanding Officer of the USAF detachment at Resolute Bay alerted all Search and Rescue organizations, including the USAF in the Newfoundland Base Command, the RCAF, the U. S. Coast Guard, and the Alaskan Air Command. Meanwhile, Thule radio informed Resolute Bay that the aircraft radio signals just prior to the landing had been of approximately the same signal strength as those signals received at Resolute Bay. This was the first clue as to a possible location, other than that the aircraft should have been within possibly five hundred

miles of Resolute Bay. Thus it was tentatively determined that the signal strengths indicated that the aircraft was roughly equidistant from Resolute Bay and Thule.

3. At 0230Z, 25 March, radio contact was established between Resolute Bay and the downed aircraft. The radio operator of the aircraft had been able to operate the auxiliary power unit of the aircraft and the liaison radio, and Resolute Bay was then informed that the crew was safe but the weather was bad and no celestial shots could be taken. Since reasonably accurate weather maps were being plotted at Resolute Bay, it was decided to attempt to locate the aircraft by pressure plotting of data available to the aircraft. The aircraft was asked to transmit, along with any terrain characteristics observed, altimeter settings from the aircraft altimeter, which was set at sea level altitude and the reading made from the altimeter setting window on the standard aircraft altimeter. Wind directions and estimated velocities were also to be transmitted as well as variations in estimated ceiling and cloud condition. The exact time of a frontal passage noted by violent wind-shift was recorded, which placed the aircraft on a definite north and south line through Ellesmere Island. By the night of the 25th, it was fully well established that the aircraft was within an elliptical area whose short axis was less than 100 miles, as plotted on the weather map at Resolute Bay. Had the high overcast condition continued or had the navigator's sextant been broken, it would have been relatively easy to locate the crashed aircraft, particularly after some time had elapsed and the amount of weather data had grown.

4. However, on the night of the 25th, the cloud condition at the crash area began to break and the navigator of the crashed aircraft was able to obtain a few astro shots of certain stars, some of which were identifiable. These shots were plotted by another navigator at Resolute Bay, and three (3) successive shots gave almost identical positions. Then a radio blackout prevented further communication. At this time all search agencies were de-alerted in order to prevent saturation of northern facilities, as it was apparent that the aircraft could be located quite easily, $77^{\circ} 55'$ north and $77^{\circ} 10'$ west.

5. On the morning of the 26th, a search B-17 departed Resolute Bay for the crash area. A message was relayed from the crashed airplane to the B-17 through Eureka Sound radio giving an exact position as determined by the navigator on the ground which verified the positions as previously computed at Resolute Bay. Upon the approach to the crash area, a VHF radio signal was received from the crashed aircraft, homing was



accomplished by means of a VHF homing adaptor in the B-17, and drops of emergency equipment and food were made to the crew.

6. On 27 March, a ski-wheel C-47 accompanied by a covering B-17 arrived at the scene of the crash and evacuated the survivors none of whom had any ill effects resulting from the crash. The survivors reported upon returning to Resolute Bay that the aircraft was in fairly good condition, having made a rather smooth belly landing and having sustained minor damage to the underside of the fuselage. It was decided that the aircraft could be flown from the area of the crash which was a sea-ice area covered by 12 to 20 inches of drifted snow. Four (4) flights were made into the area by ski-wheel C-47 during which maintenance work, jacking up of the aircraft and minor repairs and replacements were accomplished. On 6 April, the aircraft was considered flyable. With Colonel A. R. DeBolt of this Headquarters as pilot, the aircraft made two (2) tentative runs which broke the drifts considerably. On the third run, using maximum power, a successful takeoff was accomplished from a usable area of about 4,000 ft. The fork lift was abandoned at the crash scene as in all probability its additional weight would have precluded a successful take-off.

7. The primary lessons learned from the foregoing sequence of events were:

a. Poor wind forecasting was largely responsible for the aircraft becoming lost.

b. In navigation as close as this to the magnetic North Pole, it would have been proper for the aircraft to return to Crystal II after flying for as much as three (3) hours without obtaining a definite fix.

c. Almost any information relative to terrain or weather conditions can be very valuable to a search organization.

d. If the crew of a downed aircraft can establish radio communication subsequent to a crash, a simple and successful search is practically assured.

e. Even without terrain information and even in the absence of celestial navigation facilities, the location of a crash can be closely determined by weather information reportable by the downed crew.

f. The C-82 aircraft, with its high wing and sturdy fuselage construction, is one of the few aircraft which could

have been saved in the above manner, without extensive salvage operations.

CHARLES M. McCORKLE
Colonel, USAF
Chief of Staff

12 January 1949

SUBJECT: Trip Report

TO: Commanding General
Atlantic Division
Military Air Transport Service
Westover Air Force Base
Westover Field, Mass.

1. Pursuant to SO-256, Par. 2, dated 28 December 1948, the undersigned proceeded to Goose Bay, Labrador and reported to Flt B, 2152 Air Rescue Squadron, for the purpose of participating in a rescue mission in Greenland.

2. Observations and Comments.

a. For the benefit of the reader, the following is a summary of events as they occurred during rescue operations:

14 December. Received call from Colonel Kight, Air Rescue Service, Headquarters, Washington, requesting the assistance of Captain Shaw in the Greenland rescue. Captain Shaw departed Westover and arrived at Goose Bay.

15 December. Captain Shaw and Lt. Blackwell attempted to reach BW-1, Greenland, but were forced to return to Goose Bay due to weather.

16 December. Lt. Colonel Beaudry and Captain Wood, pilot of the Alaskan Air Command C-54 #2734, and glider arrived at Goose Bay. Operational plan for rescue established and approved by General Haines.

17 December. C-54 #2734, Lt. Colonel Beaudry, Captains Wood and Shaw, and crew towed glider from Goose to the scene of the crash. Glider landed on the ice cap and two unsuccessful attempts made to pick it up.

18 December. C-54 #2734 made another attempt to pick up glider. Established complete operational plan at BW-1.

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22 December. Colonel Beaudry proceeded to BW-8 to meet JATO-equipped ski-wheeled C-47 arriving from Goose Bay by way of Crystals. Supplies dropped to survivors of crash scene.

24 December. Supply drop made at crash scene and another glider arrived at BW-1 from Goose Bay.

25 December. Another glider landed on ice cap and unsuccessful attempts made to pick it up.

28 December. Rescue accomplished with JATO-equipped ski-wheeled C-47 piloted by Lt. Colonel Emile Beaudry and Lt. Charles A. Blackwell. General Haines landed at BW-8 and greeted survivors. Colonel Bernt Balchen also arrived at BW-8. A C-82 towing a glider was forced to return to Goose Bay due to weather and no further need for the glider.

29 December. All survivors and rescue personnel returned to BW-1.

30 December. Rescue personnel and some of survivors departed BW-1 for Goose Bay.

31 December. Rescue personnel and survivors departed Goose Bay and arrived at LaGuardia Field, New York, for reception and press conference.

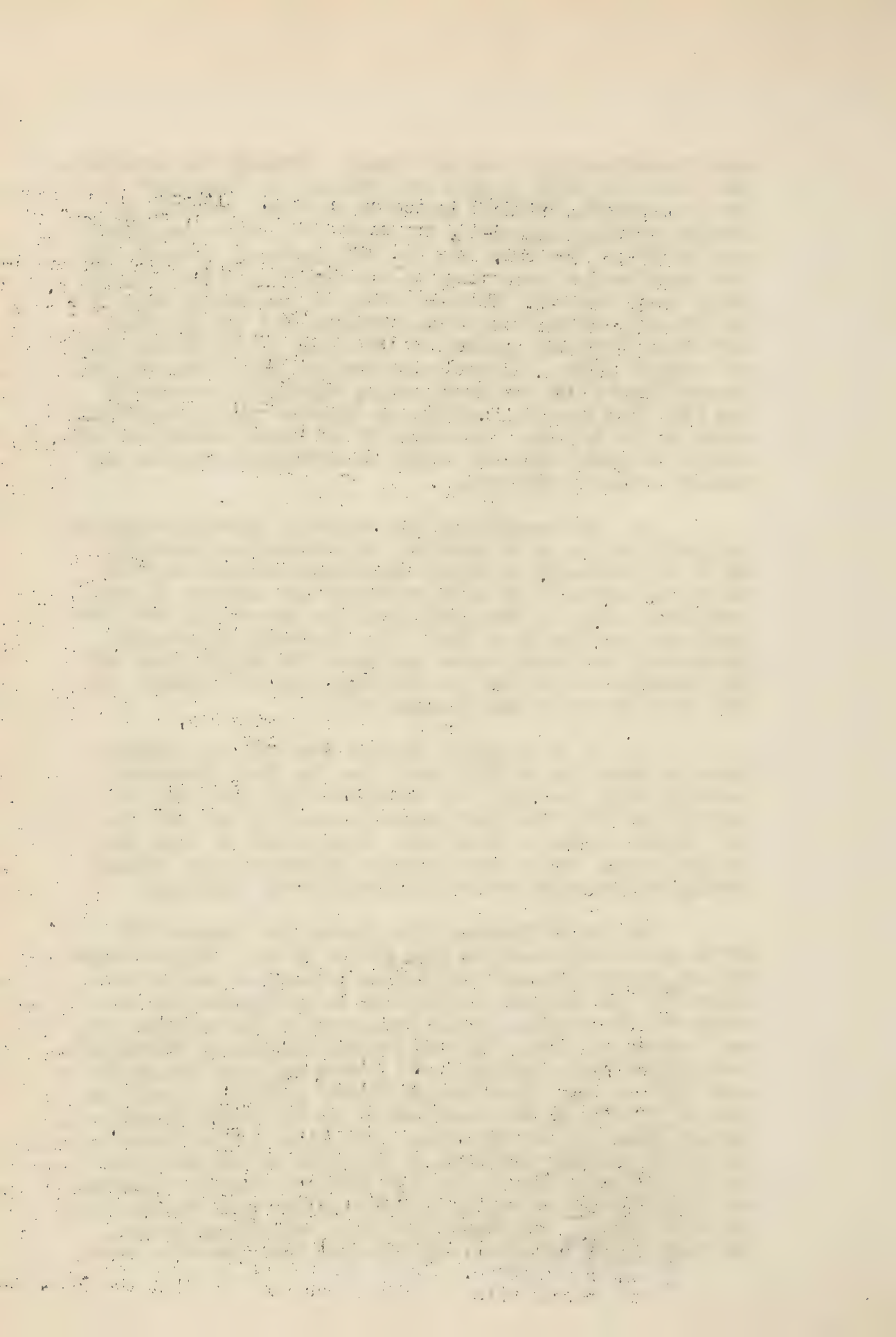
b. Departed Westover on 14 December at 1345 LST and arrived Goose Bay, Labrador, on 2045 LST. Upon arrival at Goose Bay, Labrador, contact was made with the Acting Commanding Officer of the 2152nd Air Rescue Unit. The log pertaining to all rescue activities from 9 December, when C-47 #794 crash landed on the Greenland Ice Cap, through 14 December was reviewed and notes made. From this log, it was determined that seven (7) persons had originally crash landed with the C-47. A stripped-down B-17, piloted by Lt. Ferguson of the Greenland Detachment of 2152nd ARS Unit and assisted by Sgt. Lane, the engineer, had attempted to land on the ice cap with wheels, but upon landing the wheels broke through the hard wind-packed crust resulting in tearing off the left main gear and #2 engine without injury to personnel. The decision to attempt a B-17 landing was made by personnel of the Air Rescue Detachment at Bluie West One, Greenland, and the Commanding Officer of the Greenland Base Command and his Director of Operations. All

were inexperienced in ice cap rescue. Although the personnel, who landed the B-17, proved very valuable in "know how" of Arctic survival, it would have been far more advisable to attempt this landing with a ski-wheel C-47, which was available at BW-1. This C-47 was not JATO equipped; however, had any consideration been given to the density altitude factor which would have been existent on any of the colder days on the ice cap, it would have been obvious that the ski-wheel C-47 would have been capable of effecting a landing and take-off without JATO. A later check revealed that a copy of the Snowman Report was available, which definitely establishes the fact that wheeled landings can be made only in specified areas of the ice cap. The scene of the crash landing was not within or nearby any area, which is considered suitable for wheeled aircraft landings.

c. Upon completing the review of operations carried out prior and up to 14 December, the undersigned contacted Lt. C. H. Blackwell, a highly experienced ski-wheeled C-47 pilot, and asked if he would volunteer his services to proceed immediately to Greenland where the ski-wheeled C-47 aircraft was standing by at BW-1. Lt. Blackwell volunteered immediately and arrangements were made for Captain Shaw and Lt. Blackwell to proceed the following day, 15 December, to BW-1 by a Greenland Base Command B-17.

d. On 15 December, Captain Shaw and Lt. Blackwell departed Goose Bay at 0400 local time for BW-1, Greenland; however, after two hours out from Goose Bay, word was received from BW-1 that that base had closed in and that the B-17 should return to Goose Bay. Upon return to Goose Bay, it was learned that a C-54 towing a glider with Lt. Colonel Beaudry aboard would arrive at Goose Bay the next day.

e. On 16 December, the Alaskan Air Command C-54 #2734 arrived at Goose Bay with glider in tow. Colonel Beaudry was aboard and immediately upon landing, a meeting was called for the purpose of preparing an operations plan to carry out the rescue. During the course of the meeting, it was learned that Major General Haines, Commanding General of Newfoundland Base Command, would arrive at Goose Bay in the next hour or two. Upon General Haines' arrival, a complete plan of operations was presented to him by Colonel Beaudry, Captain Shaw, and Captain Wood. This plan was to proceed as soon as weather permitted to the scene of the crash directly from Goose Bay in the C-54 #2734 and towing a glider. An attempt would be made to land the glider upon arrival at the crash scene. The reason for first attempting to make the rescue with the glider was the fact that the C-47, which



was equipped with JATO and which was flown from Wright Field, was in poor mechanical condition and would need considerable maintenance prior to its flight from Goose Bay to Greenland. General Haines approved the plan, which was sent in detail by a TWX message to the Commanding Officer of BW-1. The reason for proceeding directly to the scene of the crash from Goose Bay was the fact that if a tow ship and glider had first gone to BW-1, the time involved in landing and take-off with the glider in tow would have prevented any rescue action on that day. Although the Commanding Officer at BW-1 desired that a landing be made there first for briefing purposes, it was decided that the personnel aboard the C-54 had more information and knowledge than the Commanding Officer at BW-1 could substantially add to.

f. On 17 December, the above plan was put into effect. C-54 #2734 departed Goose Bay at 0410 local time and upon arrival at the crash scene and establishing communications contacts with the personnel on the ice cap, turned the glider loose to land and load five members of the crash landed personnel. As soon as the personnel were aboard and the pick-up stations set up on the ice cap, the tow ship (C-54 #2734) attempted to pick up the glider; however, when contact was made, the tow line safety link broke. The reason for the safety link breaking is the fact that the wheels of the glider dug into the snow deep enough to cause more than the 8,000 lb. pull, which the safety link was designed to withstand. Another attempt was then tried, the wheels still remaining on the glider but again the safety link broke. Due to approaching darkness, it was necessary to give up any further attempt on that day. The C-54 returned to BW-1 after instructing the glider pilots to remove the wheels from the glider and strip it as much as possible in order to lighten it. They were also informed that the C-54 would arrive at the scene at daylight the following day in order to make another attempt in picking up the glider.

* * *

h. It was decided on the following day, 18 December, to make another attempt to pick up the glider from the cap. Accordingly, C-54 #2734 departed BW-1 at 1000 and arrived at the scene of the crash at 1115. Upon arrival, it was learned that complete stripping of the glider had not been accomplished but that the wheels had been removed and it would take approximately an hour to an hour and a half to remove the struts and further strip the glider. C-54 #2734 circled the area while this work was being performed on the glider. As soon as the glider was ready, another attempt was made to snatch the

glider; however, for some unknown reason on this attempt, the tow rope snapped after a successful pick up with the glider fifty feet in the air. Due to the fact that in making this attempt, a part of the re-wind tow reel mechanism had experienced mechanical failure and it was impossible to make further attempts that day. C-54 #2734 returned to BW-1 and repairs were made on the tow reel assembly. A discussion was held as to the reason for the safety link breaking after the glider was airborne and the following possibilities were revealed:

- (1) It had been necessary to make a down wind approach in order to pick up the glider. This down wind approach caused the C-54 to exceed a speed greater than indicated and above the maximum 140 miles per hour contact pick-up speed. This excessive pick-up speed caused a surge and a snap of the tow rope after the glider was airborne. It is believed that the snap following the surge caused the safety link to break. This excessive speed also caused the mechanical failure of the Model 80 pick-up unit.

i. The following plans for rescue were then established and to be put in effect in the order mentioned:

- (1) An additional attempt with a glider inasmuch as the JATO-equipped C-47 with skis had not arrived at BW-8 and word had been received that another glider was proceeding to BW-1 from Goose Bay.
- (2) As soon as the ski-wheeled JATO-equipped C-47 was ready, it would attempt the rescue. It was planned to base the C-47 at BW-8 due to the fact there was no snow on the runway at BW-1. BW-8 had sufficient snow to operate the C-47 entirely on skis. This would make it possible to remove the wheels of the C-47 and thus greatly reduce the amount of weight as well as considerable drag which the wheels despite the skis would cause in the snow.
- (3) In the event that the JATO-equipped ski-wheeled C-47 failed for any reason to accomplish the rescue, an additional glider would be used to transport a complete trail

party consisting of a team of nine sled dogs, all necessary trail equipment, Captain Shaw and one enlisted dog driver to the scene of the crash. An attempt would be made to pick up the glider with some of the survivors aboard and the remaining would travel approximately thirty (30) miles down grade to the 5,000 foot level where an additional C-47 would pick them up and return them to BW-1. In the event that the glider failed to get off, the entire party would proceed on skis down to the 5,000 foot level. Considerable criticism of this plan was brought out by those inexperienced in trail operations; however, past experience has shown that it is possible to take inexperienced personnel and ski or walk them over smooth areas of the ice cap. In 1942, three experienced trail men walked twenty-five inexperienced personnel fifteen miles over fairly rough ice cap terrain in one day.

- (4) As a last resort or in the event of extreme emergency, it was planned to attempt evacuation by helicopter; however, weather and turbulent conditions generally existing made this operation extremely doubtful. Further details regarding helicopter operations will be discussed in a later paragraph.

j. On 25 December, weather conditions were ideal to attempt another glider pick-up. An additional glider had arrived from Goose Bay the preceding day. Prior to sending or towing the glider into the scene of the crash, the glider had been completely stripped of all unnecessary equipment. The wheels and wheel struts had been removed in order to provide a toboggan-like surface on the bottom of the glider. In order to take the glider off at BW-1 where there was no snow on the runway, a triangular shaped three-wheeled A-1 lifeboat dolly was placed beneath the glider. This dolly enabled the glider to be towed by the C-54 until airborne whereupon the glider left the dolly and the dolly ran down the runway finally coming to a stop at one side of the runway. This method of making a glider without wheels airborne proved very satisfactory. Upon arrival at the crash scene, the glider was cut loose from the C-54 tow ship and landed nearly a mile away from the scene of the crash. All survivors were immediately loaded aboard after setting up the

pick-up stations. The C-54 made an excellent approach and with a minimum contact speed picked up the snatch loop from the station. In contrast to other pick ups, no heavy tug was felt at contact and it was soon discovered that the glider was not in tow. Upon contact with the personnel on the ground, it was discovered that the splice in the pick up loop assembly had pulled out and that the glider tow rope had snapped back crashing through the windshield of the glider and severely damaging the wing and aileron of the glider. The damage to the glider was such that repairs were impossible. The first glider to land on the cap was also out of commission due to the fact it had been buffeted by winds of 140 miles per hour and was filled full of snow. Upon return to BW-1, it was decided the next attempt at rescue would be with the JATO-equipped ski-wheeled C-47. Colonel Beaudry had departed for BW-8 on 23 December in order to test the JATO C-47, which had arrived at BW-8 on 22 December. Word of the failure of the fourth attempt to pick up the glider was dispatched to Colonel Beaudry with instructions for him to go ahead with JATO ski-wheeled operation as soon as possible. The reasons for the failure of the fourth attempt to pick up the glider are difficult to explain. Ideal pick-up conditions existed. Winds varied from 30 to 40 miles per hour on the ground and an ideal approach and contact were made by the C-54. The glider was practically airborne due to ground winds. The glider pilot stated that by moving the controls of the glider he could change its position through the use of surface winds only. The gross weight of the glider was estimated at approximately 5,000 lbs. The safety link in the tow line assembly, which was designed for a 8,000 pound pull, did not break; however, the splice in the tow line broke and pulled out. This tow line is designed for a 12,000 pound pull. It is believed that through ranges of temperature that moisture had somehow penetrated the splice of the nylon rope and upon being put in use in the cold temperatures of the ice cap, this moisture had frozen and expanded thus opening up the splice of the rope and when the strain was put on, permitted the splice to pull out.

k. Although it is recognized that on the basis of news releases it appeared that tremendous difficulty was being encountered in accomplishing the rescue, this was not a true picture. The survivors on the ice cap were in excellent condition and were comfortably established in warm rooms beneath the surface of the ice cap. There was no particular danger to them or no uncertainty of eventual rescue. It should be pointed out that the reason that the rescue was not accomplished more expeditiously is due to the fact that

the equipment necessary for positive rescue was not immediately available for use; therefore, while awaiting to make this equipment ready for use, it was decided to experiment with the gliders after due consideration of the safety of the experiments. The spirit of the Navy in offering its assistance is appreciated; however, the means by which the Navy intended to assist were in the opinion of experienced Arctic rescue personnel of no more value than the equipment which was already being made ready to accomplish the rescue. As proven by the Navy attempt, the North Atlantic at this time of year is extremely dangerous for any type surface vessel. Further, the weather conditions in Greenland adjacent to the crash scene are generally such that helicopter operation is impossible. For example, generally coastal areas on the west and east coasts of Greenland are "socked in" with low lying stratus. When this condition does not exist, there are generally down slope winds from the ice cap to the coast line, which cause severe turbulence over the coastal mountains. In view of these conditions, it is extremely doubtful that had the Navy reached Greenland that any further rescue operation could be carried out without mishap. . . . No request was made for experienced personnel in the field to furnish any information regarding the advisability of this type of operation. It has long been recognized by personnel who have had experience in both headquarters and field operations that important decisions must be based upon information which is in the field and that such decisions cannot be made by any headquarters without full information as to field conditions.

1. Considerable difficulty was encountered in getting the JATO-equipped ski-wheeled C-47 from Goose Bay to Greenland. This aircraft had originally been brought from Wright Field to Goose Bay and was the same C-47 which a few weeks previously had been crash landed in a wheat field somewhere in the middle west and then partially repaired and flown out of the wheat field with the use of JATO. This aircraft still had dents in the wing as a result of the crash landing in the wheat field. Its gas capacity was 800 gallons, which is not sufficient to fly from Goose Bay to BW-1 and in the event BW-1 closes in to proceed to an alternate. Due to the fact that BW-1, Greenland, at this time of year experiences very rapid changes in weather, it was decided to fly the C-47 to Greenland by way of Crystal I, Crystal II and then across Davis Straits to BW-8. This trip was not accomplished, however, without considerable difficulty due to weather and short daylight hours. The aircraft upon approaching BW-8 was unable to locate the field because of weather conditions and radio difficulties. In searching for the field, the

aircraft was spotted by personnel on the ground and was given a heading for the field and a successful night landing was made. The pilot, Lt. Blackwell, of the aircraft did not see the field until after personnel on the ground had spotted the aircraft and given the aircraft a heading to the field. Upon arrival at BW-8, the aircraft was overdue a hundred and a twenty-five hour inspection and considerable maintenance was necessary before the aircraft was ready for flight. In addition to the above, it was decided by Colonel Beaudry to completely strip the aircraft leaving only the radio, compass and VHF command radio aboard. It was further decided to remove the wheels from between the skis of the aircraft in order to further lighten it. This was possible because of the fact that there were good ski conditions on the runway at BW-8.

m. On 28 December, the JATO-equipped ski-wheeled C-47 was ready to attempt a landing and take-off from the scene of the crash on the ice cap. Previous simulated take-offs and landings had been made at BW-8 to determine the flight characteristics of the stripped-down aircraft. At 0910 local time, the JATO-equipped ski-wheeled C-47 departed BW-8 for the scene of the crash, which was located $60^{\circ} 45'$ North, $46^{\circ} 55'$ West. The aircraft landed at this position at 11:30 after making two passes over the scene in order to determine the surface conditions. Upon landing, it was found that the surface was extremely hard with the temperature at -30° Fahrenheit. No freezing of the skis occurred upon stopping the aircraft and the aircraft taxied to the survivors camp-site. Here the engines were cut and JATO bottles installed while all personnel were loaded aboard. At 1210, the aircraft engines were started and after a short run a speed of 40 miles per hour was reached at which time two JATO bottles were fired and the aircraft became airborne after an estimated total take-off run of between 1500 and 2000 feet. The C-47 then proceeded directly to BW-8 covered by another C-47 from BW-8 and landed at 1420. This operation proved a theory regarding the freezing of aircraft skis to the surface. During previous tests on the ice cap in 1947 at temperatures between 25° Fahrenheit and -15° Fahrenheit, freezing of the skis to the surface after landing was generally encountered except with lower temperatures less freezing occurred. During the ski flights of the Resolute Bay project in the spring of 1948 in temperatures ranging from -20° to -40° Fahrenheit, no difficulty of the skis freezing to the surface was encountered. On this rescue operation the temperature was -30° Fahrenheit and again no freezing of the skis was encountered. As a result of these combined operations, it is firmly believed that below -18°

to -20° Fahrenheit when the snow is frozen hard that freezing of the skis will not occur. A further analysis of the reason for this non-freezing of the skis is the fact that when the snow is frozen hard, on a slightly rough surface only a few points of the ski are in actual contact with the surface and at various times. In soft snow conditions, the entire ski is in contact with the surface, which thus creates a great deal more friction and results in warming of the ski. This warm ski when stopped moving immediately cools and freezes to the surface. The rough surface friction occurs only at points on the skis and at different points at different times. Less friction warming is encountered and such warming that does take place at the different points are cooled while other points are in contact.

n. Considerable discussion prior to the actual use of JATO-equipped ski-wheeled C-47 took place as to whether or not the C-47 would be able to generate sufficient power for take-off at the 7700 foot elevation of the crash scene. After consulting density altitude tables, it was determined prior to the use of the C-47 that at -30° Fahrenheit, the density altitude at the scene would be approximately 5500 feet. This estimation was proven when the pilots were able to obtain 40 inches of mercury pressure on the take-off run from the 7700 foot elevation of the crash scene.

3. Recommendations:

a. From a review of the equipment used and the results obtained on this particular rescue operation, there is danger that those reading the report of the operation will assume that a JATO-equipped ski-wheeled C-47 is sufficient for rescue operation on the Greenland ice cap. This, however, is not true. Due to the extremely different terrain conditions that may be encountered in Greenland, it will be necessary in order to have complete rescue protection to have numerous different pieces of equipment. The following equipment is recommended for the various types of terrain that may be encountered in Greenland:

- (1) A ski-wheeled aircraft capable of take-offs at 10,600 foot elevation. The ski-wheel combination is necessary due to the fact that many times during the winter and for several months during the summer there are no air bases near or within operational range of Greenland, which would permit a straight ski operation.

- (2) Sections of the marginal area of the Greenland ice cap are so heavily crevassed that it would be impossible for any type of aircraft or ground equipment to effect a rescue. It is, therefore, necessary to have helicopters available in the event of a crash landing in a heavily crevassed area. During the summer and many months during the winter, certain large fjords are ice free but are inaccessible to surface vessel approach from the sea due to pack ice. In order to effect a rescue in coastal areas, it is necessary to have amphibious aircraft available.
- (3) In other areas of the Greenland Ice Cap, it would be impossible for aircraft of any type to land but dog teams could be utilized. Dog teams can be flown within a few miles of most of these areas by a ski-equipped aircraft and it has been found by past experience that through the use of dog team and experienced trail personnel, inexperienced personnel can be walked or skied out to areas where ski aircraft can pick them up.
- (4) Due to the fact that weather conditions are highly localized, it is quite possible that an aircraft, which had crash landed in a crevassed area of the ice cap, could not be reached by helicopter for several days or weeks due to the necessity of waiting for ideal weather. In this case an ambulance glider could be towed to the scene of the crash and then landed without too much danger to the pilot and thus serve as a means of housing and protection for the crash personnel until such time as they could be rescued by either helicopter or dog team.
- (5) It is recommended that a ski-wheeled JATO-equipped C-47 aircraft be permanently stationed at BW-1 and that actual training operations be carried out throughout the year on the Greenland ice cap. Training operations could be carried out from BW-8

as a base of operations for landings on the Greenland ice cap. This will provide trained pilots for use in the event of an actual rescue. A hospital type glider should also be in temporary storage at BW-1. A helicopter should be maintained at BW-1 for immediate operation. Dog teams and trail personnel can be brought in from Goose Bay, Labrador, in the event that they are needed. An emergency rescue supply, including all types of survival equipment pertinent to the Arctic, should be established and maintained at BW-1 for immediate use at any time.

- (6) Survival training of not only rescue personnel but air crew members flying from Arctic bases should be a continuous program. On the present rescue, the Greenland Base Command air crew of the C-47 #794 showed a definite lack of survival training and might have suffered from not knowing what to do or how to take care of themselves after landing if it had not been for the knowledge and training of the two rescue personnel, who landed in the E-17. These two personnel instructed the members of the C-47 and assisted them in providing adequate survival protection on the ice cap.

b. In the past, it has generally been the custom of base commanders to utilize search and rescue aircraft for the purpose of carrying out base functions. As a result of this on several occasions when search and rescue aircraft have been needed for their primary function, they have not been available or have been out of commission mechanically. It is strongly recommended that any aircraft or other equipment stationed at rescue bases be utilized only for their primary functions and maintained in the best mechanical condition at all times.

c. An additional recommendation is that trained or experienced rescue personnel should not be hindered at any time during a rescue operation by administrative difficulties encountered through base commanders' operational control. Generally, base commanders are not trained rescue personnel and through lack of experience in rescue operations are not capable of making efficient decisions under pressure of necessary speed. It is believed that unless positive and

detailed instructions are issued to all base commanders having operational control of air rescue units that there will be a tendency during the stress and strain of a rescue operation for the base commander to go beyond the intended limits of operational control designated to him. It is believed that this matter should be thoroughly studied and complete detailed operating procedures issued in writing for the purpose of providing a standard explanation of the ambiguous term "operational control."

4. It is recommended that a copy of this report be sent to Headquarters, Air Rescue Service, Washington, 25, D. C.

DONALD A. SHAW
Captain, USAF
Arctic Research

PART TWO - SURVIVAL INSTRUCTIONS

HEADQUARTERS NORTH ATLANTIC WING, A. T. C.
PRESQUE ISLE, MAINE

GUIDE TO ARCTIC SURVIVAL

One experienced Arctic Commanding General truthfully said "The literary North is a lot more hazardous than the actual North." But there are certain fundamental Boy Scout principles that must be followed. If you have a forced landing, you are immediately challenged by "the will to live." Here are a few hints for you to follow until rescued.

INJURED

First take care of the injured.

1. KEEP HIM WARM.
2. KEEP HIM QUIET, lying down, at rest.
3. RELIEVE PAIN by using MORPHINE SYRETTES in First-Aid Kit according to directions therein.
4. STOP BLEEDING AND PROTECT WOUNDS as follows:
 - a. Sprinkle SULFANILAMIDE powder into the wound.
 - b. Cover freely with gauze.
 - c. Bandage FIRMLY BUT NOT TIGHTLY.
Use tourniquet only when firm bandaging fails to stop excessive bleeding.
 - d. Place the wounded part at rest, and then LEAVE THE WOUND ALONE. DON'T CHANGE THE DRESSING. Don't put fingers in the wound. A GOOD BANDAGE, SULFANILAMIDE, AND REST IS ALL THE TREATMENT NEEDED.

If the wound is large or there are several wounds, THEN GIVE SULFANILAMIDE TABLETS BY MOUTH—four tablets at once and two tablets every 4 hours.

5. TREAT BURNS AS FOLLOWS:

- a. Sprinkle with SULFANILAMIDE powder.
 - b. Cover freely with GENTIAN VIOLET OINTMENT.
 - c. Cover freely with GAUZE.
 - d. BANDAGE--FIRMLY but NOT TIGHTLY.
 - e. Put the burned part at REST.
 - f. Don't change the bandage--LEAVE IT ALONE.
 - g. MORPHINE SYRETTES for pain.
6. Treat MINOR CUTS and scratches as follows:
- a. WASH with soap and water.
 - b. Sprinkle SULFANILAMIDE powder in cut.
 - c. BANDAGE and leave alone.
7. Treat FRACTURES by:
- a. KEEP THE LIMB STILL -- Apply SPLINTS to immobilize the limb. Pad the splints with blankets or pillows. Ski poles padded with blankets and placed on each side of a fractured leg and tied with bandage every 6 inches makes an excellent splint.
 - b. Relieve pain by MORPHINE SYRETTES.
 - c. KEEP QUIET AND WARM--Administer HOT DRINKS AND HOT FOOD if possible.

REMEMBER: The injured man suffers from SHOCK. He may be pale, with cold sweat on his forehead and perhaps breathing rapidly. REST: LYING DOWN, with feet higher than the head, plus HEAT, plus RELIEF OF PAIN WILL RELIEVE SHOCK.

REMEMBER: The injured man is more susceptible to frost bite than the healthy. Protect him--guard his ears, face, hands, and feet. KEEP HIM DRY--KEEP HIM WARM. Put him in a sleeping bag.

RADIO COMMUNICATION

Set up radio communication at once. Stations are listening for you. Determine your position and send it blind if you do not hear a station. Keep your batteries charged with the auxiliary power generator. If you have gasoline left and only bent props, you may be able to use one of your engine generators. Saw off bent tips of your props at an equal distance from the hub, with the hacksaw carried in your plane for the purpose. This will eliminate vibration, give some drag, conserve gasoline, and allow propeller to revolve freely.



When the weather is clear for searching, transmit double "A" on your dinghy radio every quarter hour for 5 minutes. Planes will be tuned in on 500 kilocycles and will home on your signal. Use the kite aerial. String up a long antenna and use it when too windy for the kite. Both the kite and balloon will help planes locate you.

SIGNALS

Get out your Very pistol. Make it available for immediate use. Prepare all other ground-to-air signals. See section III, page 8, T. O. No. 01-1-67. Ignite a black smoke signal at noontime on all clear, calm days. This can be seen for miles. Natives on seeing smoke will always investigate. It is the distress signal of the North.

SHELTER



The senior officer in command of the party shall assign duties to everyone--one to cut wood, one to cook, etc.

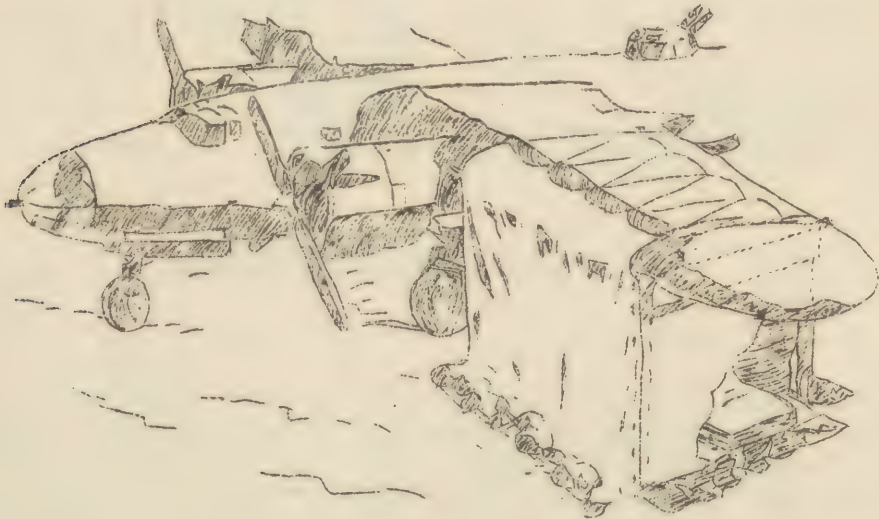
You will probably spend the first night in the plane, but this is the worst place for a permanent camp. It is cold, drafty, and uncomfortable. Broken fuel lines make it dangerous for fires inside and you might lose your whole plane and supplies. Build one of three kinds--

- a. Lean-to in the woods.
- b. Shelter under wing.
- c. Snow dugout.

a. Use available engine and wing covers, parachutes, and any tarpaulins. See section III, pages 9 and 10, T. O. No. 01-1-67 for "A" type lean-to. Put a heavy layer of small spruce boughs on the floor for insulation. Build your shelter facing two closely growing trees. Fill space between the trees with spruce poles in a concave shape. This is the chimney of your open fire and will also reflect heat into your shelter. In wooded sections a larger style of lean-to can be made by stringing a pole between two trees and stretching a canvas or parachute silk from the pole to the ground on a 45° slope.

Put canvas at the ends and snow or earth on the bottom of the canvas making everything as airtight as possible except the open front. Face this lean-to away from the prevailing winds. Build the open wood fire in front of the lean-to for warmth and cooking. Put a high pole over fire for drying clothing.

b. In barren-land country make a shelter under the wing by hanging canvas. Build this on leeward side of plane for wind protection. Over the leading and trailing edges it will be easy to hang the canvas by tying lines over the top of the wing. But the other two sides can be supported by tucking the canvas over a tightly tied line which goes completely around the wing. Chink up all the cracks, put boughs, seat covers, or plane insulation on the snow or ground for protection from the cold or wet. Let two canvasses overlap for a doorway.



c. If down on the Greenland Ice Cap make a dugout. It is easier than an igloo if you've never made one. First shovel a ditch 5 feet deep. Tunnel into the windward side making an igloo-shaped cavity as illustrated. The top will be about 10 inches thick where small hole must be cut for ventilation. If the snow drifts in, cover with a snow block, then ream a hole with your sheath knife, making the opening to leeward and you'll have ventilation and no snow. Make the floor level for sleeping. Put something under your bags for insulation, i. e., snowshoes, rope, plane insulation, canvas. After entering the dugout close up the entrance with a snow block, chinking the sides with loose snow. This will freeze solid, so it is a MUST that you always bring inside, your shovel, saw, or snow knife. The inside walls become icy and it is

not easy to get out without tools. Put an engine cover over the entrance ditch. Anchor it down with snow blocks. This will keep out a lot of drifting snow. An adjoining dugout as illustrated can later be built for quarters and the first dugout used for a latrine. Dig a hole and cover it up. Shovel this second dugout through a small hole in the top, closing it again by snow blocks and chinking it from the outside.



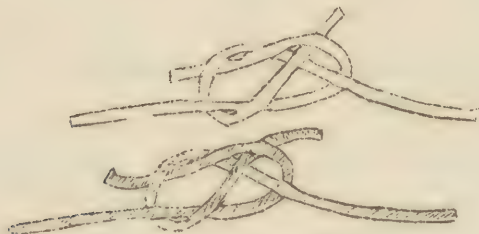
IMMEDIATE VICINITY RECONNOITERING

It is wise to learn all you can about your immediate locality. If in the woods be sure not to get lost. Use your compass. It is best to travel in pairs and when crossing ice on lakes or streams, rope yourselves together 50 feet apart. Look for game and all signs of native travelers.

On the ice cap be most cautious of crevasses. These large deep cracks in the snow's surface are the most dangerous hazard in Greenland. They are often bridged with a snow crust. Usually the bridges are slightly depressed but do not rely on recognizing this characteristic. In "pea soup" visibility or drifting snow, when horizons and depth perception have disappeared, it is impossible to recognize a bridged crevasse. Rope yourselves together (usually three men 50 feet apart) and explore your surroundings only on days with clear visibility.

Always have rope and parachute lines coiled and in readiness to pull a man out of a crevasse. Prepare at least 250 feet. Use two parachute shroud lines in each length and join the shrouds with the knot as illustrated. Each individual

line has a tensile strength of 450 pounds but you need two as insurance against chafing or a knot becoming untied. Lower a parachute harness--it is better than a rope under your arms. Edges of crevasses will break, so work on your stomach roped to another man in the rear.



HUNTING AND FISHING

Whenever you see game, bag it. Spruce partridge and ptarmigan are found in Eastern Canada and Labrador. They can be tracked in the snow and shot with a .22 caliber rifle. They are not wild and if hunted quietly will not flush until you are close. Look for them in the upper branches of spruce trees or feeding on the banks of streams and lakes. Ptarmigan and other small birds are found on the coast of Greenland.

Rabbits and squirrels are everywhere in the woods of eastern Canada and Labrador, but not in great numbers.

Seals found on the coast are the most valuable game. In the fall and early winter shoot them on the ice or in the water. They will float. In the summertime shoot them on the rocks for they are thin and will sink in water. The meat and fat are rich. Eat it raw or cooked. The blubber will burn in a helmet for warmth and cooking. When hunting seals crawl on your belly until within range. In the wintertime on ice, wear white parachute covering for camouflage and approach the seals slowly and carefully. If you shoot a polar bear do not eat the liver; Eskimos say it is deadly poison.

Fishing in streams and lakes and fiords will net results. Follow suggestions in your fishing kits.

BURNING 100-OCTANE GASOLINE

One hundred-octane gasoline is volatile. These fumes will explode easily, so be careful. A simple stove can be made by using a canteen cup or any other small container. Place rags in the bottom about an inch thick--saturate with gasoline and about one-half an inch of clear gasoline above the rags (total depth of gas only 1 1/2 inches). Use sand, soil, kapoc, or asbestos (from lagging) in the order listed if available, in place of rags. Ignite the stove by dropping a lighted match into the cup. It will burn for half an hour. Carbon monoxide will be discharged. Be sure there is plenty of fresh air circulation to prevent poisoning. There will also be a lot of soot. So it is suggested to cook and dry clothes in a shelter, separate but adjacent to the living quarters. For boiling water place another mess cup on top of stove as in illustration. Be sure the stove cup is not upset. Never add gasoline to this cup while burning, or if cup is still hot.



SUNBURN, FROSTBITE, SNOWBLINDNESS

1. SUNBURN is dangerous even in the Arctic. Guard against it. Prevention is worth more than any cure. Cover burned areas with COLD CREAM, GREASE, VASELINE, or if nothing else is available, cover it with GENTIAN VIOLET OINTMENT from

first-aid kit.

2. SNOWBLINDNESS--PREVENT IT. It is painful. WEAR DARK GLASSES CONSTANTLY ON CLEAR OR HAZY CLOUDY DAYS. BLACKEN the skin around the eyes with soot from a burned match or a burned rag or cover the eyes with paper or cloth in which a small horizontal slit has been cut for vision.

3. FROSTBITE--Avoid it by:

- a. Keeping face, ears, nose, wrists, and hands covered.
- b. Keeping feet DRY AND WARM.
- c. Frozen areas are blanched. Inspect each other's faces frequently to see if they are frozen.

Treat frostbite as follows:

- a. DO NOT APPLY SNOW OR ICE.
- b. Place warm hand on FROZEN PART OF FACE OR EARS until thawed. Do not rub hard. PLACE FROZEN HANDS IN CROTCH OR UNDER ARMPITS. A FROZEN FOOT IS THAWED by placing it against the warm BELLY of a companion.

FOOD

Pemmican is provided for emergency rations. Fourteen pounds per person will give 3,300 calories each day for 14 days. If you are way off course and do not expect immediate rescue, go on half rations after the first week. The senior officer is in command of the party and it is his duty to inventory all foods on the plane and ration it.

The value of any ration is greatly increased by heating.

CLOTHING AND SLEEPING BAG

Too much emphasis cannot be given to keeping yourself dry. Wet clothes mean freezing and frostbite. When exercising,

AVOID OVERHEATING. Sweat-soaked underwear accentuates freezing so avoid perspiring. Several layers of clothing are warmer than a single thick layer. Avoid tight clothing, tight shoes, and tight gloves. Constricting clothing conducts heat from the body increasing the danger of freezing. Snow-filled clothes when brought into the shelter will melt and freeze. Brush off your clothes meticulously. Use the back of your sheath knife if you have no brush and beat the snow out of your clothes. Flying suits are hot for working. Snow and sweat will soon make them icy and cold. Do not get overheated. Wear a dry pair of socks to bed at night. Put the damp socks and woolen mittens in your bag under your shoulders and they will dry. If you have an open fire, hang them in the heat from poles or snowshoes stuck in the snow. But be sure to brush off all the snow first. Otherwise the snow will melt and soak the garments and they will never dry. When drying clothes over an open fire watch them constantly for burning.



Getting into a sleeping bag sounds easy but should be done with great care. First brush all snow off your clothes so you will take none into your bag. Take off your shoes and trousers; sit in the open end of the bag. Next dry your bare feet with a rag and put on dry socks. Slide your legs into the bag. Wrap a scarf or cloth around your waist to keep your hips warm. Wiggle down into your bag using the flying jacket to tuck around your shoulders and for a pillow. Leave your hat on for warmth. It is all right to leave on pile parkas or sweaters but trousers which bind and leather jackets are bad. You will be warmer in your underwear. Put your leather jacket under the bag at shoulder position for insulation. Do not put your head into your bag. Your exhaled breath which is full of moisture will make it wet for subsequent nights. If in real arctic conditions, wrap a scarf or sock around your head and breathe through it. The

moisture in your breath will solidify on the outside of the scarf and not in your bag. In the morning reverse the process--sit up and put your parka or flying jacket on before getting completely out of your bag. On going to bed always leave your clothes handy for the morning.

GENERAL PRECAUTIONS

1. PROLONGED EXPOSURE TO COLD, PLUS FATIGUE, PLUS INSUFFICIENT FOOD, MEANS DEATH BY FREEZING. Avoid freezing to death as follows:

- a. DO NOT BECOME EXHAUSTED. REST AND SLEEP WHEN TIRED. Remember--on a full diet you can stand cold and exercise. On a reduced diet you are unable to combat cold or exhaustion. The smaller the diet the more time you must stay in the sleeping bag.
- b. Deep breathing which comes with over exertion may cause disability in low temperatures. AVOID OVER EXERTION.

FOUR DON'TS

1. Don't lose your head--keep calm and use judgment in what you do.
2. Don't sit around and watch game. Go out and bag it. You may need to eat it.
3. Don't burn an open gasoline fire in close quarters. It gives off carbon monoxide.
4. Don't be careless with an axe. A cut foot will not only disable one but can incapacitate the whole group and might prevent rescue. When chopping wood remember to have your hands below your knees when the axe hits the tree. If you miss the tree then the head of the axe will miss your foot.

CONCLUSION

This summary in no way gives all the answers to arctic comfort or the methods of survival under special conditions. But it is intended for a guide to get you thinking. Apply common sense in all you do. Remember that you are on your own and must be resourceful. Read the Boy Scout Camping, Pioneering, and First Aid Books. Open all packages and equipment so you know what supplies you have. You might find some more food or clothing.

Note.--IF YOU ABANDON THE PLANE FOR ANY REASON, BE SURE TO BLOW UP THE BOMB SIGHT AND IFF EQUIPMENT.

KEEPING YOUR MIND IN SHAPE

If you are stranded, alone or with some others, on the sea, in the desert, or jungle, or cold north country, you will find that you have to overcome not only the tough conditions around you -- but also some inward dangers within your own mind.

You may not be able to avoid these dangers entirely just by knowing about them beforehand. But if you do know about them beforehand, that knowledge will keep you from getting alarmed at the experience if you do have to meet them.

These are the main things you have to guard against:

Feeling lonely.

Feeling completely lost.

Feeling helpless.

Feeling completely bored.

Worry about your situation, especially if you have a lot of time to worry, as in a lifeboat.

Feeling that you are forgotten.

Body changes such as hunger and thirst, which cut down your will power and which may trick your eyes and ears.

Your weapons against these forces are: activity, ingenuity, a fighting spirit, humor, and sometimes faith.

Fight being lost. Most people feel very upset in their minds when they don't know where they are or what day it is. You would probably not think about this until it happened to you. You don't realize how strong this feeling can be because it very seldom happens in regular life that you get lost or lose track of time.

But "Where am I?" is one of the first things a person who has been unconscious usually wants to know when he comes to, especially if he's in a strange place. And you have a funny feeling when you find out it is Thursday after thinking all day it was Wednesday or Friday.

You are very likely to feel much more anxious about these things if you really don't know where you are and can't find out for sure -- or if you lose track of the days.

If you have a watch in good running condition when you find yourself stranded, take the best care of it. Protect it

carefully from water and sand. Be sure to wind it regularly.

Keep a record of the passing days and weeks, even if you have to do it by scratching lines on a small, pocket-size stick -- or by putting one small pebble or hard berry in a special pocket every day.

You may not realize the importance of this at first. But later, if you're a long time getting to help, it will make you feel better than perhaps you think it will to be able to say whether it is Sunday or Thursday, and how many days you have been on your own.

If you have no watch, there are other ways of telling time within an hour or so. In the day there is the sun; at night, the moon and stars. You don't have to be an astronomer in order to use the stars to tell you time and direction. If you are able to recognize only the Big Dipper (or other star groups), you will notice that it circles around the North Star with the same precision as the hands of a clock. You will soon learn where it is at different times of the night so that if you have been sleeping you can tell about how long it is since you were awake.

If you are north of the Equator, you can also look at the stars in the southern part of the sky and pick some pattern of stars that you will be able to recognize night after night. You will soon become familiar with the pathway of these stars westward through the sky, and they, too, will tell you both time and direction.

Be sure, also, to use some method of keeping track of your travels each day -- how far you go and in what general direction. Make as careful a record as you can. It will give you a surprising amount of satisfaction after a while to have this record, even if it is a rough one.

These two records, your records of time and of direction-distance, help you avoid the feeling of being completely lost. There is more about record keeping in other parts of this book.

Fight fear. You may not be very scared at first. But sooner or later, especially if you are alone, you will feel almost as scared as a small boy lost in the woods on a dark night. No man has ever been lost from his outfit in dangerous terrain, or on the unfriendly ocean, without feeling afraid inside.

It is not like the sharp kind of fear that you get just

before going into battle, when your mouth is dry and your fingers tremble and you are so nervous you can't sit or stand still. But the duller prolonged fear that comes from being lost may be even harder to stand up under.

This is because you can't fight back at anything with your weapons -- your rifle, tommygun, or knife -- in the ways you have learned to fight the enemy. What you need to remember when you are lost or stranded is that you can always fight with your brain. Against your enemies you fight with your weapons and your brain. To overcome distance, exposure, feeling bored; you will need the power of your mind even more than that of your muscles. You can figure and scheme and plan and fight your way to safety with your wits and good sense.

This kind of fighting is action, too. And action is the most effective weapon against fear and worry.

The man who feels badly frightened during the tough minutes before an attack begins to lose his fear -- or forgets it -- as soon as real action starts for him. But you probably won't be able to kill all your shaky feeling about wind or sun or starvation or thirst right away as soon as you begin to do something about the situation. But while you are busy, with your mind, or your muscles, or both, you get less worried. And each success in overcoming the things that worry you raises your morale -- helps you feel you are going to make the grade.

Success in fixing up a shelter against the sun, or working out a way to catch the rain to drink, or in finding or catching something to eat -- these give protection to your mind as well as to your body.

It is by inventing a great many small tasks for their hands and minds that other men have managed to endure long weeks and even months of horror and hardship. They kept busy.

Fight time. For the man who has to be alone for many days or weeks, it is of the utmost importance to kill time. Dragging time is a powerful enemy to the mind of any man cut off from other men.

The best possible time-killer is work that helps you to have better shelter, to get food, to make yourself a little more comfortable.

Next in importance is learning new things that make you better able to get along in the situation you are in. For example, men at sea on a life raft should welcome the chance to learn something about navigation, if any man in the group has this knowledge — or if the lifeboat or raft is equipped with a manual on navigation. The man best able to do it should give regular lessons every morning. The lessons in navigation will then be not only an interesting, useful way to pass the time, but will also provide one regular event to mark the days, and give all men something to think ahead to every day.

Everything else that can be thought out as a practical help to your rescue is a profitable way to use up time. Work out in detail what you should do if a rescue plane comes near. Also, just what you would do if the enemy appears. Games, especially those that take skill, puzzles, riddles and parlor magic tricks, are also good for killing time. And so are big stories, true stories, and old songs and poems. When there are several men, they can put together half-forgotten verses to old tunes, and invent new verses for old and new songs such as Mademoiselle from Armentieres and Pistol-Packin' Mama.

Fighting for a sense of proportion. When you are facing uncertainties that contain at least a threat of death, there is some danger of beginning to think about everything in an unreal way. Things that once seemed very important lose all their importance. You may begin to lose interest in everything. Things may begin to seem far away, unreal, hardly worth fighting for.

If you begin to feel like this, you should fight the feeling. It won't get serious if you notice it early and then try right away to find a better way to look at your situation. When you come through the experience of the jam you are in alive (or even if you don't) the whole thing will be only a small, though tough part of your whole life.

You may get to thinking that you have been in this particular green or brown or white-ice hell for a hundred years. That is one of the tricks which being separated and alone and exposed to dangers can play on your mind. If this happens, keep on making a strong conscious fight to remember the difference between yesterday, today, and tomorrow. You must try to live in today. The snake you almost stepped on yesterday can't possibly bite you today. The sun that may be frying hot again tomorrow can't possibly make you uncomfortable tonight.

It is also a help if you can manage to look at your fix as if you were somebody else -- like a man from Mars. This isn't easy to do. It's hard but it's a big help, and worth trying. If you can think long and hard until you are able to see yourself and the others almost as God might see you, it will help greatly to keep your thinking clear.

You finally figure that you're not the only guy catching hell in this war.

Tricks your senses play on you. Extreme hunger, thirst, isolation, fatigue, and exposure to heat or cold can cause your senses to play tricks on you. You may see things that aren't there. You may hear imaginary noises in the empty stillness around you. If this happens to a man who doesn't know about it beforehand, he can be badly scared. But it isn't serious. It's much like the kind of nightmare you might have in a fever.

In the jungle, the strange night noises may be especially worrying to you. Your mind doesn't have to be very tired and worn for you to think that the strange calls and yells of birds or animals are human voices giving you the works and trying to run you nuts. But they are just noises that birds and animals make because they feel good or feel scared themselves.

Sometimes, when you see things that aren't there, the fault is not with your eyes or your brain either, but with strange conditions of the atmosphere. In the sandy desert, the light rays may be refracted so that you really do see the sky down in the sand like a lake. This is a mirage. Back home you have seen the same thing, but on a smaller scale, when you have looked down a long level stretch of paved road on a hot summer day, and seen the road shine like water far ahead.

There are mirages at sea, too. There the reflection may look like a ship or an iceberg, and you see it in the clouds. With nothing at all visible on the whole empty expanse of water around you, you may suddenly see a ghost ship sailing along in the air. To make it seem more confusing, the sky ship may be hanging upside down in the clouds.

Don't let such mirages worry you. They are just visual illusions, and they have been duplicated experimentally. They may be startling, but they have practically nothing to do with your state of mind.

Some other things you think you see may actually come from your own mind. After long periods of waiting for rescue you may have some trouble in keeping your dreams and daydreams from mixing. This means you will have dreams while you are awake. These aren't anything to worry about, either, except that you may do something dangerous to yourself in such a dream -- like trying to walk overboard.

If you are stranded for many days on a life raft, you are pretty sure, sooner or later, to think you can step right over the side and walk away. If you are alone, you must be on guard against this temporary trick of the mind. If you are with others, be ready to hold them back if they get such a notion -- and remind them to do the same for you.

It has been reported that men driven by thirst to drink sea water are more likely to have such illusions than those who are able to keep from drinking any of it. Don't drink the salt water no matter how dry you get. It will only make you sick and add to your thirst.

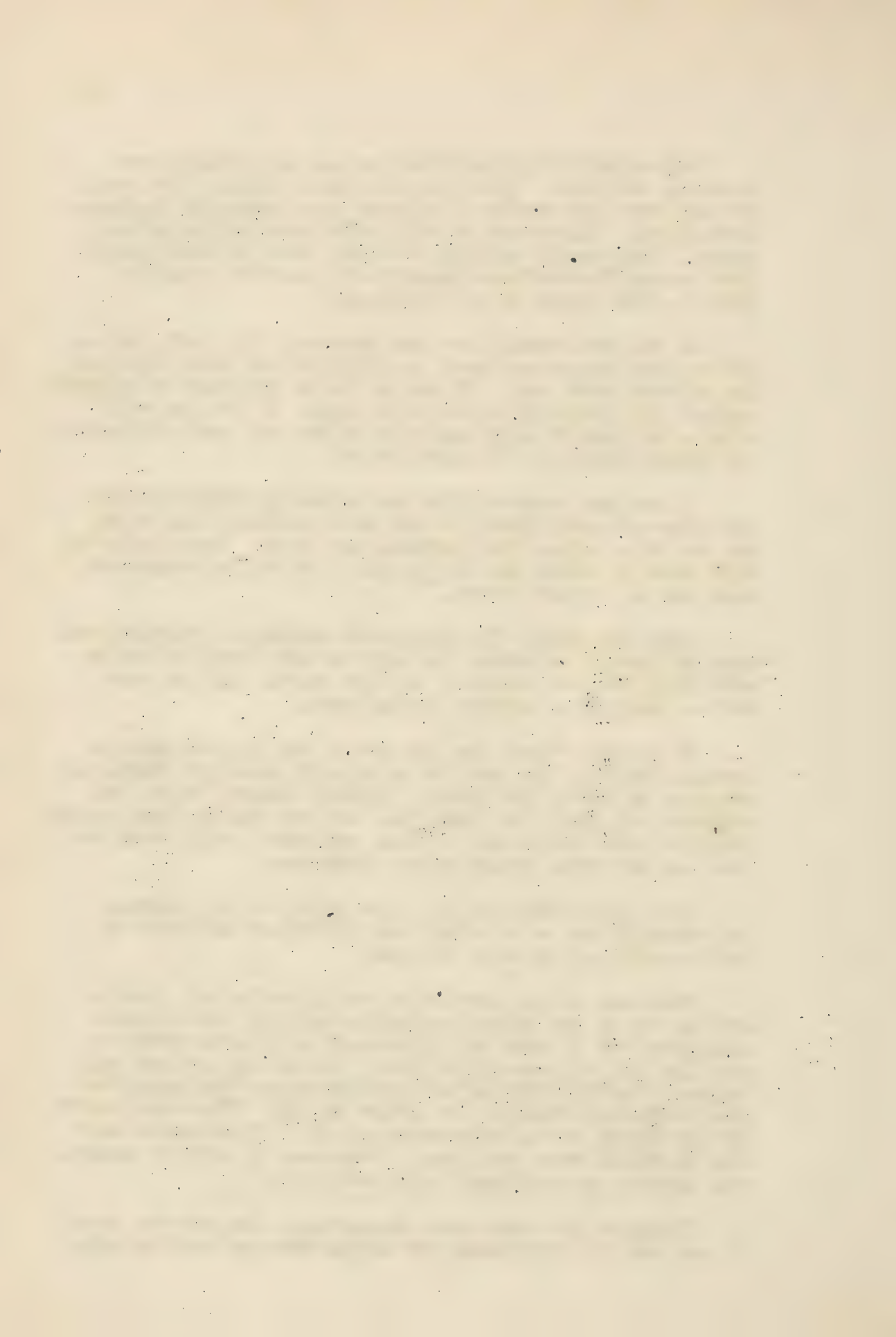
Fight for faith. No matter what hardships a fighting man must go through, no matter how hard he must fight, no man is ever truly defeated until he has lost heart. And men have died -- many men -- without losing heart.

It is never "easy" for any man to keep up good spirits during a battle. But when the going gets downright tough, and you have to battle the weather, insects, hunger, thirst and sickness, and maybe the enemy too, and keep up the fight single-handed or with little help -- then your morale will break unless you have some strong belief within you.

For a great many men this is a belief in the goodness and wisdom of God -- a belief that individual suffering is just a small part of some big plan.

Other men do not have a firm religious belief. Such a man may try to get hold of religious faith in time of great emergency, but it must be a close part of a man's nature to give him real help at such a time. But men who are not deep believers in God often do hold another belief that seems to give tremendous comfort -- a belief in fate. "The shell won't get you unless it has your number on it." "Your number won't come up unless it's your turn." "Whatever is going to happen, will happen, and what isn't will never come."

Thoughts like these have strengthened the guts and minds of many men in tight places and helped them put up a stronger



fight to get safely through.

There are many true stories in the war of men who have come through OK after weeks of hardship. But the story of a Chinese seaman, who wasn't in any armed service at all, shows best how a man can make the grade. He was alone on a raft for 143 days -- four and a half months -- with hardly any equipment. He was OK mentally and not in bad shape physically when he was rescued. When he ran out of water, rain came, and he figured out a way to catch it to drink. When he ran out of food, he was able to catch some fish. After a while, he decided that the devil didn't want him -- that he was not going to die at sea. His faith in this had to be strong to last through such a long experience.

It is also a help to know how hard it is to starve to death. With water to drink, you can stay alive for a number of weeks on the food stored in your own body. One man on a hunger strike went without food for 73 days -- and then didn't die of starvation but of something else.

Here are some sayings -- some of them old ones -- that may help to strengthen your faith as you are trying to come through a jam:

While there is life there is hope.

You never have to endure a whole week of suffering at one time, or even a whole day. This moment right now is all you have to face at one time. By the time another comes, this one will be gone.

Nothing continues forever. This, too, will pass.

The darkest hour of the night is just before the dawn.

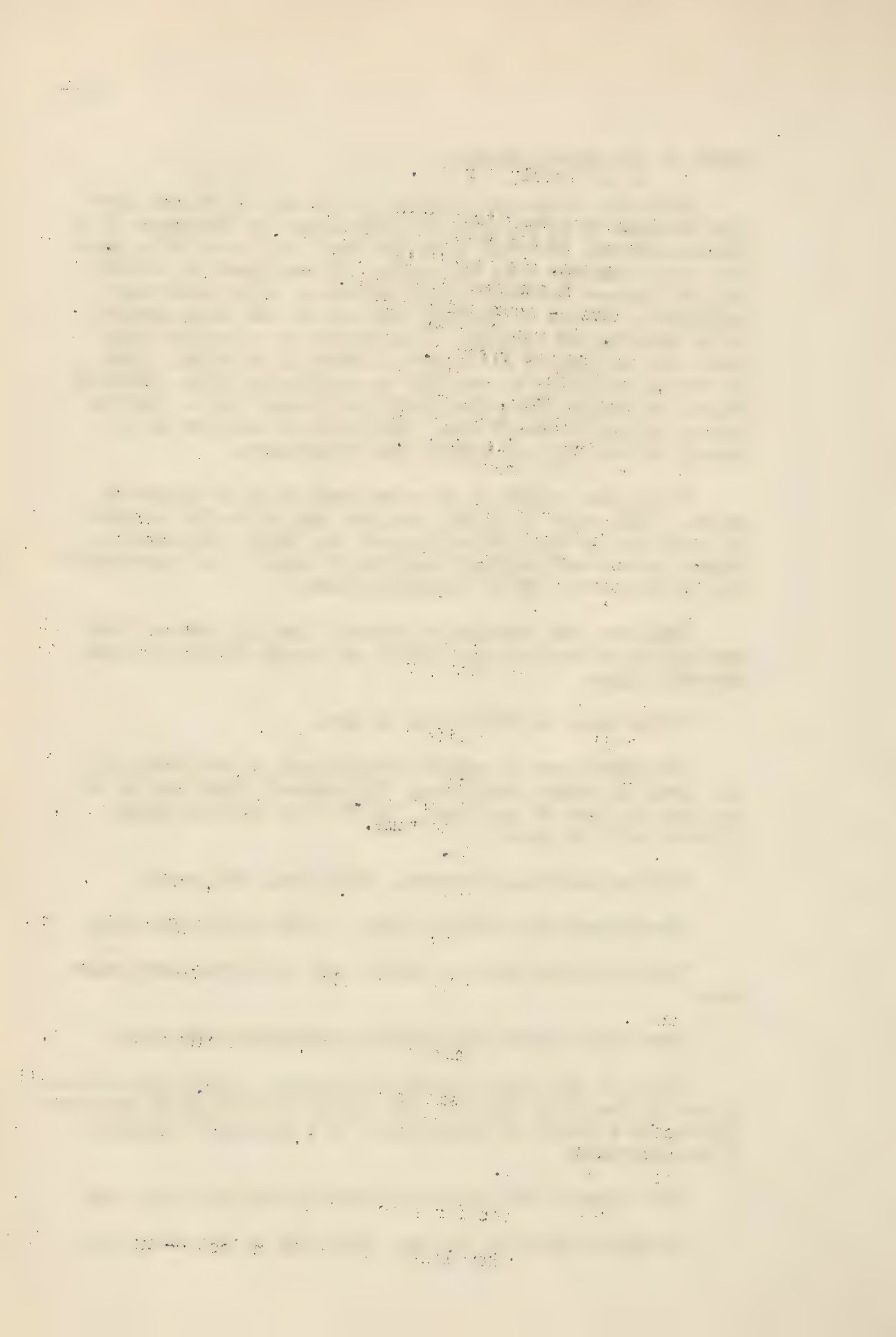
You will never have to endure what is beyond your endurance.

When pain becomes unbearable, unconsciousness comes.

There is also some comfort in figures. There are millions of men in the Armed Forces. The number who have died from exposure, as a result of being lost, is a very small fraction of one per cent.

Your chances for rescue or reaching help are very big.

No matter how long you have been lost -- no matter how



long you have been waiting for rescue -- your chances for today are just as good as they were on the first day. If you rolled a 3 in a crap game yesterday, it has absolutely no effect on your chances for rolling a 7 today.

There is a chance, if you should get stranded, that you might reach a place where you can exist in fair comfort but might have to wait a long time for rescue. For example, you might reach an island by boat and have to stay there many months. The chances of this are small because this war has spread activity into many parts of the world which used to be isolated and without people living there.

PART THREE - SURVIVAL EQUIPMENT

MEDICAL PLAN FOR ASSISTING CRASH VICTIMS

This accident precipitated a plan which the NAD Surgeon had had in mind for some time. In case of a crash of a transport aircraft where a considerable number of injured personnel survived, the facilities of most of the NAD medical installations would be taxed to such an extent that outside assistance would be needed. This would cast no reflection on the station involved since it was felt that ten to fifteen seriously injured patients arriving simultaneously would tax the facilities of installations much larger than those of the NAD.

It was therefore proposed to establish a Divisional Medical Crash team consisting of one Orthopedic Surgeon, one General Surgeon, one Dental Officer with maxillo-facial training and three nurses. In addition, there would be established a pool of supplies, including plasma, orthopedic equipment, oxygen tents and penicillin. It was planned that the personnel and supplies would be alerted at the time of a crash and dispatched promptly to that locale at the direction of the Division Surgeon. This team would work under the supervision of the Base Surgeon concerned for whatever period might be necessary and would return to its home station when released.

Accordingly the Surgeon, Station Hospital, Presque Isle, Me., was directed to establish a Division Medical Crash team as outlined above. This was done and the team was fully prepared for use whenever needed. However, the necessity for using this team did not arise during the remainder of the year.

The accumulated experiences of Major James Bell, MC, the Surgeon at Harmon Field, with aircraft accidents led to the conclusion that certain factors, in a measure controllable, influence survival following critical injury. Among these factors were:

"a. Time:

- (1) Required to locate crash.
- (2) Required to bring up emergency drop kits.
- (3) Required by Rescue Party to reach the scene over land or water.
- (4) Required to prepare survivors for transport.

- (5) Required to transport survivors to the hospital.

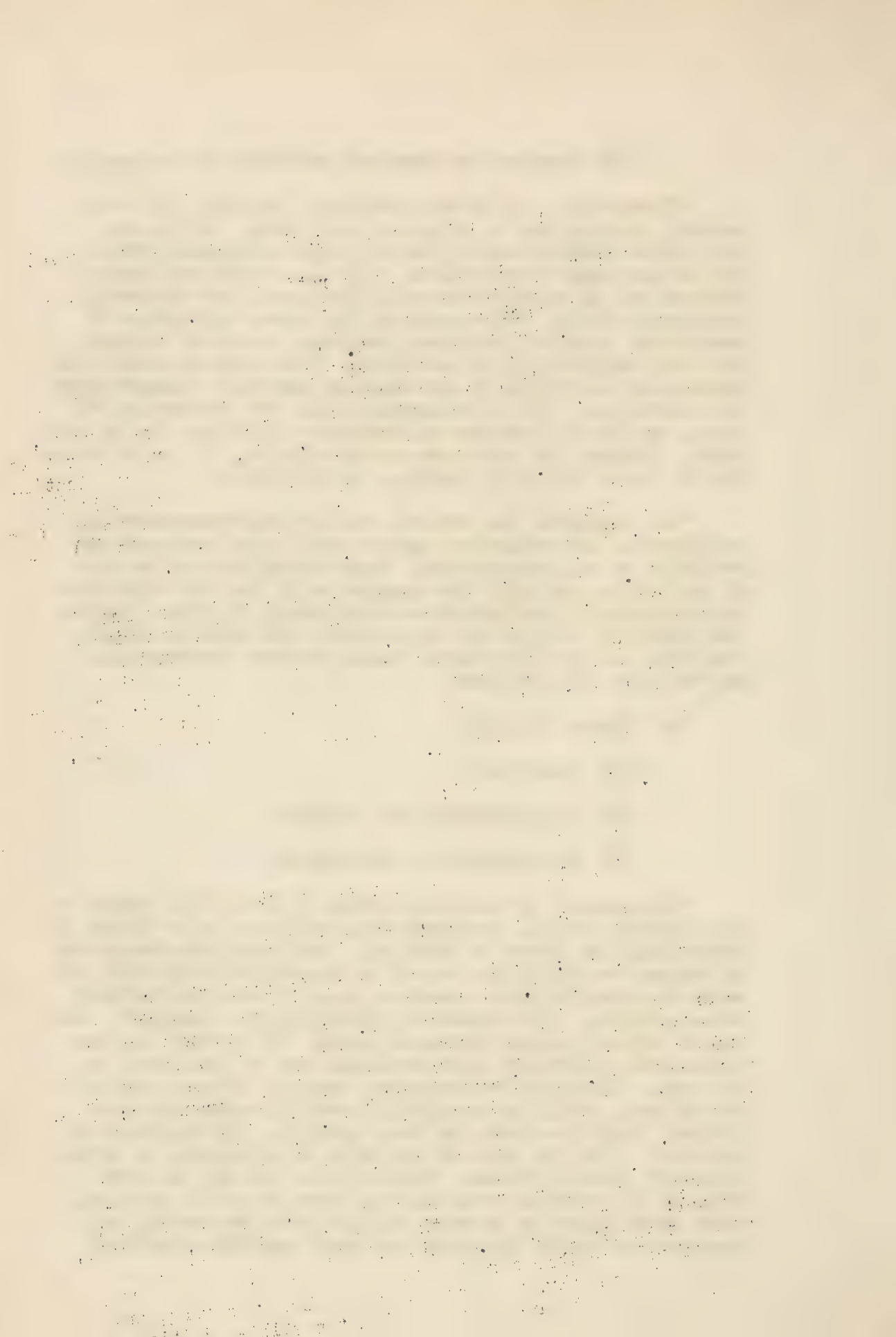
"Discussion: (1) is an Operational function, and with careful planning may be reduced to a minimum. (2) is also Operational function and by having proper equipment, marked and at hand, may be very short. (3) is a Search and Rescue function and by coordination with Operations need involve no unnecessary delay. (4) depends on the number and nature of casualties, weather conditions, darkness, nature of terrain, and ready availability of materials. Time required under this heading may be reduced by establishing immediate communication with survivors. (5) is influenced by all the factors in (4) above, and by the distance and transport conditions to the hospital. Because the latter are uncontrollable, (1) to (4) above should, in so far as is possible, be anticipated.

"b. Exposure: Any and all weather conditions must be anticipated, and protection against cold, rain, and wind made available as soon as possible. Such protection must be easy of application and must take cognizance of the fact that those administering it may themselves be seriously injured. Cumbrous tents for injured are impractical; heat must be readily available, as seriously burned hands preclude woodchopping, and wet wood will not burn.

"c. Trauma (injury):

- (1) Immediate
- (2) In preparation for transport
- (3) In transport to the hospital

"Discussion: By immediate trauma is meant that caused by the accident itself. Obviously this will be a major factor in determining the chance of survival. Such immediate trauma may be reduced --- as in the case of an unconscious individual who could be extracted from a burning plane if asbestos clothing were available. (2) Trauma in preparation for transport: moving of injured persons increases shock. If exposure has been eliminated preliminary shock treatment may be instituted on the spot. Materials for transport, such as litters, bandage, and splints, should be immediately available when such preliminary shock treatment has been executed. (3) transport to hospital: from the scene of the crash to ambulance, or boats, transport involves trauma. This will be less apt to prove fatal if all possible care has been taken to avoid exposure, treat shock promptly, prepare adequately before moving, and transport at a rate involving the least possible additional



injury. It may appear elementary to point out that jarring and shaking due to rough roads or seas may easily counteract any advantage gained by speed.

"From the above discussion it will be seen that when time locating crash has been reduced to a minimum the next most important factor is that of furnishing survivors proper emergency equipment by air. Since personnel involved in a crash will have variable medical knowledge, equipment and instructions must be so simple as to be obvious to those with the least training and experience. Equipment should be supplied in logical sequence and at intervals permitting its application without confusion to the survivors using it.

"With all these factors in mind a series of drop kits is proposed. These should be numbered, labeled, and stored in the Rescue plane in proper sequence. It is proposed that they be dropped after preliminary exercises with dummy kits to determine the range, at intervals of 10 to 15 minutes, to permit the application of the contents of each kit before the next is dropped. All kits should be plainly labeled "Remain at the scene of crash."

SUGGESTED CONTENTS FOR CRASH KITS

Kit #1

Asbestos suits, gloves and masks (2)
 Blankets, labeled "Cover all injured" (12)
 Automatic hot water bottles labeled "Hot water bottle
 -- add cold water -- makes own heat" (12)
 Light weight, water resistant, tarpaulins labeled
 "Cover all injured" (12)
 Walkie-Talkie radio tuned to tower frequency labeled
 "Press button and talk to plane" (1)
 Electric lanterns (2)
 Water (4 qts) in metal container, easily opened
 Matches (wind) (6 pkgs)

Kit #2

Light weight mountain tents without floors, fitted
 for rope or pole suspension (2) -- one to serve for
 cook, tent, one to serve as supply tent
 Sterno stoves (2)
 Sterno cans (24)
 Nescafe, in metal container (1 lb)
 Case knives (2)
 Axes, small (2)
 Kerosene (1 gallon)
 Water, in metal containers, suitable to set on Sterno
 stoves (2 gals)
 Paper cups (48)

Kit #3

Bandage scissors, large, (2) -- to cut clothing
 Caffeine sodium benzoate syrettes (24)
 Morphine sulphate syrettes (12) labeled "Push plunger in,
 pull out, and inject one (1) only per person"
 Liquid plasma (12 sets)
 3 ft. wire supports for plasma bottles (12)
 Ophthalmic ointment (butyn and metaphen) (4 tubes)
 labeled "for eyes, insert small amount"
 Sterile cotton 1/2 lb (2)
 Alcohol 1 oz (2)
 Tourniquets (2)
 Sterile gauze squares 4 x 4 (48)
 3" gauze bandage (24)
 Hot chocolate mix (dry) (2 lbs)

Kit #4

| | |
|--------------------------|-----------------------------|
| Collapsible litters (12) | (Navy type manufactured by |
| Thomas Leg Splints (6) | Herron Bros. & Meyer |
| Thomas arm splints (6) | 10-1 Ration (1 unit) |
| Basswood splints (24) | Tin plates (12) Spoons (12) |
| Blankets (12) | Litter straps (24) |

DISTRIBUTION LIST

- 1 CG, Strategic Air Command
Offutt Air Force Base
Fort Crook, Nebraska
ATTN: Operations Analysis Section
- 1 CG, 4th Fighter Wing
Andrews Air Force Base
Washington 20, D. C.
- 1 CG, 82nd Fighter Wing
Grenier AFB
Manchester, New Hampshire
- 1 CG, 56th Fighter Wing
Selfridge AFB, Michigan
- 3 CG, 307th Bomb Wing
MacDill AFB, Florida
- 5 CO, 307th Bomb Gp
MacDill AFB, Florida
- 5 CO, 306th Bomb Gp
MacDill AFB, Florida
- 21 CG, 311th Air Division
Topeka AFB, Topeka, Kansas
- 11 CG, 8th Air Force
Carswell AFB, Ft. Worth, Texas
- 1 CG, 97th Bomb Wing
Biggs AFB
Biggs Field, Texas
- 5 CO, 97th Bomb Gp
Biggs AFB
Biggs Field, Texas
- 1 CG, 7th Bomb Wing
Carswell AFB
Ft. Worth, Texas
- 5 CO, 7th Bomb Gp
Carswell AFB
Ft. Worth, Texas

- 1 Hq Air Rescue Service
MATS
Washington 25, D. C.
- 3 CG, Air Weather Service
Washington 25, D. C.
- 2 Commandant
United States Coast Guard
Washington 25, D. C.
ATTN: Search and Rescue Agency
- 1 CG, 27th Fighter Wing
Bergstrom Air Force Base
Austin, Texas
- 1 CG, 509th Bomb Wing
Walker Air Force Base
Roswell, New Mexico
- 5 CO, 509th Bomb Gp
Walker AF Base
Roswell, New Mexico
- 1 CG, 33d Fighter Wing
Otis Air Force Base
Falmouth, Mass.
- 5 CO, 1st Strategic Support Unit
Biggs AF Base
Biggs Field, Texas
- 1 CG, Fifteenth Air Force
Colorado Springs, Colorado
- 1 CG, 93d Bomb Wing
Castle AF Base, California
- 5 CO, 93d Bomb Group
Castle AF Base, California
- 1 CG, 28th Bomb Wing
Rapid City AF Base
Weaver, South Dakota
- 5 28th Bomb Group
Rapid City AF Base
Weaver, South Dakota

THE HISTORY OF

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IN

THE

- 1 CG, 43rd Bomb Wing
Davis-Monthan AFB
Tucson, Arizona
- 5 CO, 43rd Bomb Gp
Davis-Monthan AFB
Tucson, Arizona
- 5 CO, 2nd Bomb Gp
Chatham AFB
Savannah, Georgia
- 1 CG, 92d Bomb Wing
Spokane AF Base
Bong, Washington
- 5 CO, 92d Bomb Gp
Spokane AF Base
Bong, Washington
- 1 CG, 98th Bomb Wing
Spokane AF Base
Bong, Washington
- 5 CO, 98th Bomb Wing
Spokane AF Base
Bong, Washington
- 12 CO, 72nd Rcn Sq (VLR) Photo
APO 731, c/o Postmaster
Seattle, Washington
- 2 CO, 375th Rcn Sq (VLR) Weather
APO 731, c/o Postmaster
Seattle, Washington
- 18 CG, Alaskan Air Command
APO 942, c/o Postmaster
Seattle, Washington
- 2 Air Adjutant General
Washington 25, D. C.
ATTN: Operations Analysis Section
- 11 CG, Tactical Air Command
Langley AF Base, Virginia
ATTN: Operations Analysis Section
- 2 CG, Air Force Training Command
Barksdale AF Base, La.

- 1 CG, 301st Bomb Wing
Smoky Hill AF Base
Salina, Kansas
- 5 CO, 301st Bomb Group
Smoky Hill AF Base
Salina, Kansas
- 1 CG, 22d Bomb Wing
Smoky Hill AF Base
Salina, Kansas
- 5 CO, 22d Bomb Group
Smoky Hill AF Base
Salina, Kansas
- 2 Arctic, Desert, Tropic Information Center
Maxwell AFB, Alabama
- 6 Air University Libraries
Maxwell AFB, Alabama
- 2 CG, Newfoundland Base Command
APO 862
New York, N. Y.
- 1 Armed Forces Staff College
Norfolk, Virginia
ATTN: Library Division
- 1 Dr. Hoyt Lemons
Research and Development
Office of Quartermaster General
Department of Army
Washington 25, D. C.
- 1 Dr. Paul Siple
Research and Development
Department of the Army
Pentagon
Washington 25, D. C.
- 1 Eastern Area U.S. Coast Guard
Rescue Coordination Center
80 Lafayette Street
New York, N. Y.
- 1 Library
The Engineer School
Fort Belvoir, Virginia

- 4 CG, 82nd Airborne Division
Fort Bragg, North Carolina
ATTN: G-3
- 1 CO, 12th Rescue Squadron
Andrews Air Force Base
Washington 20, D. C.
- 1 CG, North Atlantic Wing
MATS
Westover Field, Mass.
- 1 CG, Yukon Wing
Alaskan Air Command
APO 731, c/o Postmaster
Seattle, Washington
- 1 CO, School of Aviation Medicine
Randolph AFB, Texas
- 1 CO, 2151st Rescue Unit - Flt B
Biggs AFB
Biggs Field, Texas
- 7 CO, 2150th Rescue Unit
Hamilton Field, California
- 1 CO, 2151st Rescue Unit
Lowry AFB
Denver, Colorado
- 1 CO, 5th Rescue Squadron
MacDill AFB, Florida
- 1 CO, 2150th Rescue Unit (Flt B)
March AFB, California
- 1 CO, 2150th Rescue Unit - (Flt C)
McChord AFB, Washington
- 1 CO, 5th Rescue Unit (Flt C)
Maxwell AFB, Alabama
- 1 CO, 2151st Rescue Unit (Flt C)
Selfridge AFB, Michigan
- 1 CO, 5th Rescue Squadron (Flt D)
Westover AFB, Mass.

- 1 CO, 6th Rescue Unit (Flt B)
APO 864, c/o Postmaster
New York, N. Y.
- 3 CO, 6th Rescue Unit
APO 864, c/o Postmaster
New York, N. Y.
- 9 CG, Air Materiel Command
Wright AFB, Ohio
- 1 CG, Air Proving Ground Command
Eglin AFB, Florida
- 11 Hq Army Field Forces
Fort Monroe, Virginia
- 6 The Armored Center
Fort Knox, Kentucky
- 1 The Artillery School
Fort Sill, Oklahoma
- 1 Air Adjutant General
Washington 25, D. C.
ATTN: Director of Intelligence
- 2 Army Field Forces Arctic Test Branch
APO 733, c/o Postmaster
Seattle, Washington
- 1 CO, 2059th Air Weather Wing
Tinker Air Force Base
Oklahoma City, Oklahoma
- 1 CO, 2060th Mobile Weather Squadron
Tinker Air Force Base
Oklahoma City, Oklahoma
- 1 CO, AF Technical School
Chanute Air Force Base
ATTN: Director, Dept of Weather
Chanute Field, Illinois
- 5 CO, 2108th Air Weather Group
Westover Air Force Base, Mass.

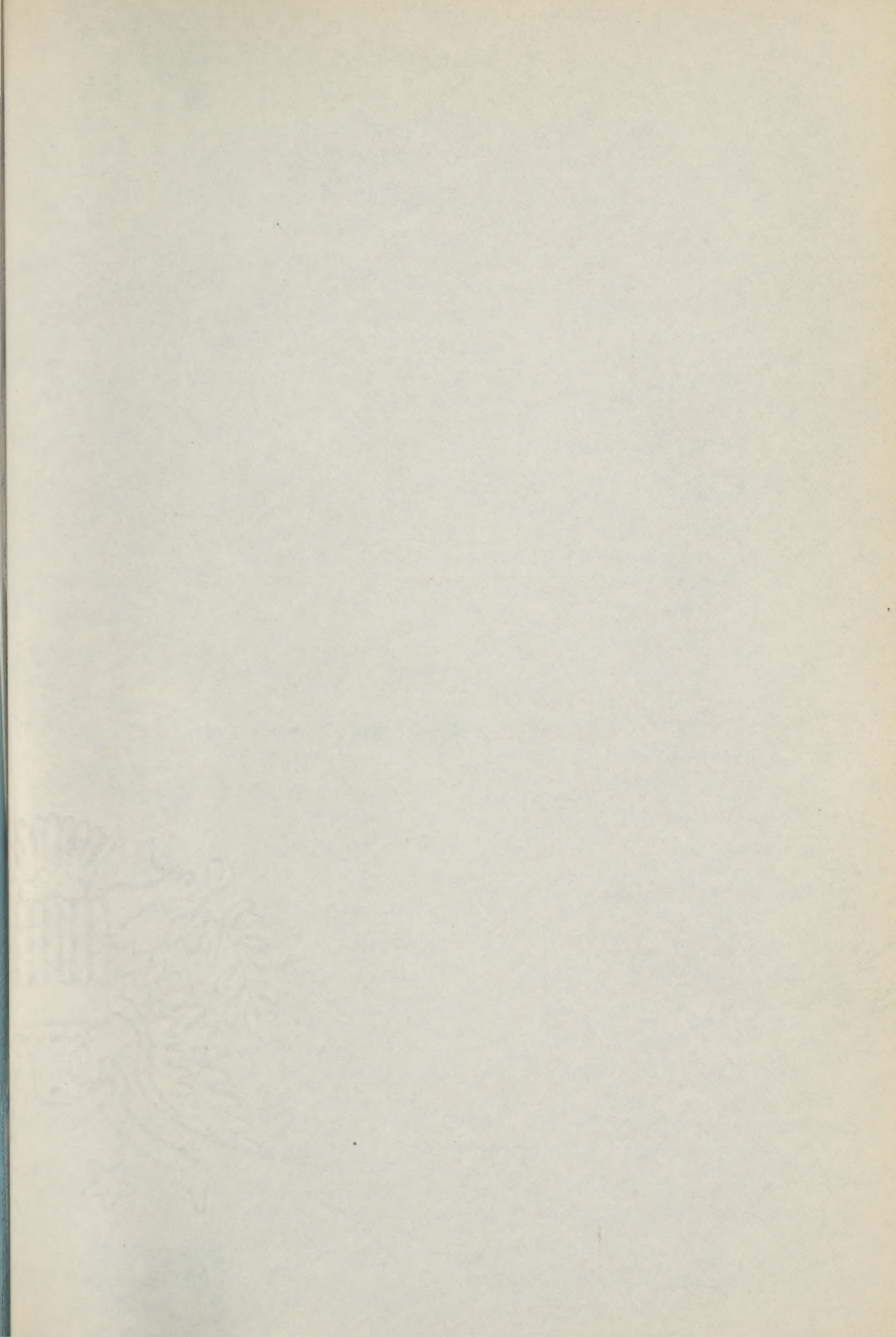
- 5 CO, 2107th Air Weather Group
APO 942, c/o Postmaster
Seattle, Washington
- 5 CO, 308th Reconnaissance Group (Weather)
Fairfield-Suisun AFB, California

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